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SUBMISSION OF:	**UNPRICED** **Technical Proposal**
SUBMITTED TO : (Client)	**SAUDI CHEVRON PHILLIPS CO. (SCHEM)**
RFP REF NO.:	**RFP- REQ 25000942**
PROJECT TITLE:	**Site Execution Service, Inspection and Overhaul on Extruder Machines (SPCo TA 2022)**
GAS REFERENCE NO.:	**GAS-FSD-2110-87**
DATE:	**28th October 2021**
REVISION:	**NO. 00**
VENDOR NO.:	**118856**

GAS Arabian Services
GAS Building, Tareeq 112,
Corner 275,Support Industries–Section 3
P.O. Box 10487 – Al Jubail 31961
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31/10/2021

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CLIENT	SAUDI CHEVRON PHILLIPS CO. (SCHEM)	GAS REF	GAS-FSD-2110-87		
TITLE	Site Execution Service Inspection and Overhaul on Extruder Machines (SPCo TA 2022)	REV	00	28-Oct-21	DATE
SUBJECT	TECHNICAL PROPOSAL	Reference.:	RFP- REQ 25000942		
CONTRACTOR	GAS Arabian Services	Closing Date:	1-Nov-21		

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TECHNICAL PACKAGE

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Cover Letter

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"COVER LETTER"

Date: **28th October 2021**
GAS Ref.: **GAS-FSD-2110-87 Rev.00**

To,

Mr. Mustafa Syed
Contracts Engineer
Office: +966 13 359 6567
Fax: +966 13 358 2208
Email: SYEDM@saudichevron.com

Contracts Department
SAUDI CHEVRON PHILLIPS CO. (SCHEM)
Al-Fanateer Square, Chamber of Commerce Building, 5th Floor- 512
Jubail, Kingdom of Saudi Arabia

From:
Mr. Khalid Jamal Al Dabal
GAS Arabian Services Co., Ltd.
Tel. No.: +966 13 340 7919 ext. 888

Subject: "Site Execution Service Inspection and Overhaul on Extruder Machines (SPCo TA 2022)"

RFP Reference: RFP- REQ 25000942

Dear Sir,

We are pleased to submit our Technical proposal to carry out Site Execution Service Inspection and Overhaul on Extruder Machines.

GAS Arabian would perceive that the goals during execution of the job are HSE (Health, Safety & Environment), Quality, On-Time Completion, and Cost-Effectiveness, and we would commit to the accomplishment of these objectives.

GAS Arabian quantifies the execution of a successful contract by its HSE achievement, on-time completion, and no callback during any warranty maintenance period.

Further, we certify that our proposal is in complete and total compliance of the bid documents and clarification provided to us by ***SAUDI CHEVRON***.

We hope that you will find our offer in order and will meet your requirement, and we will be pleased to discuss all aspects of our offer. Please contact us or e-mail at vijoy@gasarabian.com and 966555214182.

Thank You & Best Regards,

31/10/2021

Khalid Jamal Al Dabal
General Manager - Field Services Division

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Signed Scope of Work Compliance

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EXHIBIT – I

Scope of Work for Extruders Overhaul in TA 2022; SPCO South

1.0 DESCRIPTION OF WORK – GENERAL

Except as otherwise expressly provided elsewhere in this Contract, CONTRACTOR shall provide all labor, supervision, material, equipment ,inspection resources, prepare record books, furnish all materials, transportation, freight forwarding, customs clearance, material receiving and handling, warehousing services, utilities, supplies, tools & equipment, temporary facilities and each and every item of expense necessary for the **" Site Execution Services for Inspection And Overhaul On Extruder Machines At Unit 42,43 & 44"** at the COMPANY facility in Jubail Industrial City.

2.0 DESCRIPTION OF WORK

Synopsis

We are planning a major overhaul/Repair activity on our extruder machines and extruder's system related works at Unit 42, 43 & 44 of our Plant SPCO (south). Work will be completely executed by your company's Engineers , Supervisors , site crews for Gear box & process parts under supervision & advice of OEM's Engineers. Therefore, this scope covers both execution & supervision to comply quality , safety & schedule requirements.

Site Contractor will provide assistance to Coperion' s team for handling various parts, hydro-blasting, cleaning, lifting, dismantling, fitting, shifting & other maintenance tasks. Coperion will be provided all the support of site resources by Schem 's contractor through this scope. This manpower will consist of Rotary technicians, Fitters, Riggers, Insulators, Electricians, Instrument Fitters, Scaffolders & helpers.

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Barrel may need to go under chemical cleaning , but for this particular activity a separate contractor will be hired by Schem and this scope does not cover " chemical cleaning". However, to meet the requirement of chemical cleaning , necessary site support & coordination for isolation/blinding would be done under this scope.

So, it is expected that while submitting its technical proposal, contractor will make sure to include the Manpower, equipment & tools to be utilized/deployed for all three units based on 24 Hrs. activity schedule along with meeting all requirements of technical proposal listed in technical proposal requirements. Being the responsible for the scope execution & completion with meeting quality & safety standards, it is also desired that contractor will not limit its technical proposal up to the requirements put forward by Schem only and will incorporate all necessary technical details whatever in his opinion are "must include" details relevant to the project in hand.

Intent of engaging Contractor in a lump sum contract for subject scope means that Contractor would be having ultimate responsibility & ownership of the work execution till its completion within the agreed time frame conforming work quality parameters.

Scope of work has been derived on the basis of history of the equipment, maintenance activities carried out during TA 2016 & afterward till date and also refined by the review discussions & Meeting held on scope among reliability, TA, operation & Coperion(OEM) team. Detailed scope has been drafted on basis of following key Understanding & agreements over overhaul strategy of extruders and are listed as under.

- All bearings, seals & O-rings would be replaced as part of standard overhaul activity
- In case of Discovery after inspection screw shaft ,replacement would be carried out
  - For Unit42/43 , 01 screw shaft available , Elements would also be available.
  - For Unit 44 , Screw & Elements would eb available.
- In case of Discovery after inspection of Barrels , replacement decision will be taken.

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- For Unit 42 Barrels are available in stock
- For Unit 43/U44 New barrel would be available as per OEM's recommendations

- Screw & Barrels will be hydro blasted. In addition, Barrels will be chemically cleaned also (in case Old barrels are in good enough condition and are recommended to be re-used after inspection.) Chemical cleaning is not part of this contract , as separate contractor will be engaged. However, to transport it to separate yard for chemical cleaning , it would be contractor's responsibility.
- All hard Parts, screens & strainers would be cleaned & inspected. NDT will be performed on hard parts as described in detailed scope. NDT will be done by Schem but preparation for NDT is contractor's scope.
- Wear Measurements for screw shafts & Barrels would be recorded using COBRA instrumentation by OEM. Facilitation to make it possible in terms of cleaning requirements , would be contractor's scope.
- All Oils & lubricants would be replaced. Supplies would be by Schem , services by contractor.
- All damaged Elements & flights will be replaced.
- Leak tests of Screw/Barrel assemblies & No-Load Test Run.

(Detailed scope against each Tag no is described in scope table , part of this document in following section)

<u>Composition of Bid Documents</u>

Bid document has been sub-divided in ***<u>Two major sections</u>***.

- **Section – A**; This section explains the Brief & Detailed scope of work, Split Task Lists of Sub-assemblies on Extruder , Timelines , Requirements for technical proposal . For ease of cost evaluation unit wise, a summary table for all units along with individual units have been made part the document. This section consists of following sub-sections as under;

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- *Sub-Section-1; Scope Brief*
- *Sub-Section-2; Detailed Scope (List of Worklist Items Unit Wise Divided in 03 Categories)*
- *Sub-Section-3; Timelines (Available Maintenance Windows)*
- *Sub-Section-4; Requisites of Technical Proposal*
- *Sub-Section-5; Parallel Scopes (Extruder Building Jobs to be carried out independently by Schem or Schem's contractor, Not part of this scope)*

- **Section – B;** This section contains information about General and Scope Related Special terms & conditions for Bid Scope. This Section Contains Contractors & Schem's responsibilities & requirements specific with current scope (Point No 1 & 2) and standard contractual Terms & Conditions (Point no 3 onward) .

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SECTION –A

SCOPE OF WORKS

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Sub-Section-A; Scope of Work (Brief)

A brief for SOW will be highlighted in this section. Scope of Work for each Unit has been divided in 03 major parts (Process Section, Gear Box Section & Dryers). This Brief summary of scope has been expanded in detailed maintenance scope in the later part of the document with clear demarcation in accordance with the segments of brief scope and also are marked with the Job IDs. Price Schedules have been designed on pattern of "Scope Brief "described as under.

Important Note; It is also note-worthy that some scope on extruder systems will be carried out by Schem's own maintenance team or its subcontractors, independent of This Bid' s scope and is listed ***in separate section-6 of parallel jobs***. Purpose of keeping Schem's Parallel scope in bid document is to communicate Bidder of this Bid Document about the possible schedule interface & integration. It may facilitate the bidder for optimization of schedule & Resources.

1. **Unit 42/ZSK380 /HDPE**
   - 1.1. **Overhaul Screws, Barrels & Process Section assemblies**; Overhauling of Screw & Barrels that includes all dismantling & Re-assembling of process parts, existing barrels & screws, screen changer, Die Head housing, pelletizer system (assembly & Gear Box), DAV valves, Hydraulic system & other accessories. Replacement of the damaged parts.
   - *1.2.* **Overhaul Suprex gearbox**: Replacement of wearable parts at a minimum; Replace Oil. Change all bearings and sealing, check all installed parts as gears and shaft. This job also involves Uncoupling & Recoupling of Motor with Gear Box, solo run testing & alignment of Main Drive Motor. *(Motor Dismantling, Overhauling, Installation, Rigging or electrical testing is not part of this scope).*
   - 1.3. **Overhaul Pellet Dewatering Dryers 42X84/85;** Replacement of Bearings, sprockets & Dry Screens
2. **Unit 43/ZSK380 /LDPE**
   - 2.1. **Overhaul Screws, Barrels & Process Section assemblies**; Overhauling of Screw & Barrels that includes all dismantling & Re-assembling of process parts, existing barrels & screws, screen

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changer, Repair of Any Polymer leaks , Die Head housing, pelletizer system (assembly & Gear Box), DAV valves, Hydraulic system & other accessories. Replacement of the damaged parts.

2.2. **Overhaul Suprex gearbox**: Replacement of wearable parts at a minimum; Replace Oil. Change all bearings and sealing, check all installed parts as gears and shaft, Repair of Gear Box Bolts. This job also involves Uncoupling & Recoupling of Motor with Gear Box, solo run testing & alignment of Main Drive Motor. *(Motor Dismantling, Overhauling, Installation, Rigging or electrical testing is not part of this scope).*

2.3. **Overhaul Pellet Dewatering Dryers 43X84/85;** Replacement of Bearings, sprockets & Dry Screens

3. **Unit 44 / ZSK350 / PP**

3.1. **Overhaul Screws, Barrels & Process Section assemblies**; Overhauling of Screw & Barrels that includes all dismantling & Re-assembling of process parts, existing barrels & screws, screen changer, Die Head housing, pelletizer system (assembly & Gear Box), DAV valves, Hydraulic system & other accessories. Replacement of the damaged parts.

3.2. **Overhaul Flender gearbox**; Replacement of wearable parts at a minimum; Replace Oil. Change all bearings and sealing, check all installed parts as gears and shaft. This job also involves Uncoupling & Recoupling of Motor with Gear Box, solo run testing & alignment of Main Drive Motor. *(Motor Dismantling, Overhauling, Installation, Rigging or electrical testing is not part of this scope).*

3.3. **Overhaul Pellet Dewatering Dryer 44X84;** Replacement of Bearings, sprockets & Dry Screens

Note; following support would be provided by S-Chem

- *Instruments Dismantling*
- *Electrical disconnections*
- *Scaffoiding & Insulations*
- *Material handling & Rigging*
- *Sub-contractor's support*

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Sub-Section 2; DETAILED MAINTENANCE SCOPE

Detailed Maintenance Scope of Work for Extruder's Overhaul Unit 42,43 & 44
Unit 42, HDPE Scope

Line:	Unit 42
Machine:	ZSK 380
Machine no.:	20507503
Project no.:	64020862
SWZ:	21000
MP:	NA
UG:	1000
Polymer	HDPE
manufactured	2009

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Extruder's System Related- Rotating Scope - Unit 42

OEM-SC - OEM & Subcontractor

SOW Doc Ref#	JOB ID	Unit	Tag No	Equipment Name	Scope of Work	Equipment Group	Execution Strategy
1.1	SPCo-SP-0726	42	42V80	Extruder	1. Remove screw shafts for wear measurement. 2. Hydro blast polymer from screw shafts. 3. Unstack screw shaft elements for inspection for wear & Replacement (AWR) as recommended. 4. Verify spare screw timing using roll test before installing in barrels. 5. Clean elements and NDT splines for cracks. 6. Clean and NDT screw shaft for cracks. 7. Hydro blast barrels for inspection. 8. Measure barrel wear using COBRA instrumentation. 9. Remove barrels to replace gaskets if required due to polymer leaks. 9a; If Barrel replacement is decided after inspections , these would be replaced(AWR) 10. Overhaul the screw shaft seal if worn, replace the sealing set. 11. Check all heating and cooling connection piping and valves. 12. Check the instruments, N2 control unit of Meco seals. 13. Chemical cleaning by Acid flushing all barrel sections. 14. Perform leak test for cooling and heating circuits. 15. Replace Meco seals. 16. Grease the screw shaft couplings. Note ; Spare Barrel & Elements would be available If barrels would be replaced, then chemical cleaning would be not required on old barrel (By other contractor)	Rotating	OEM-SC

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1.1	SPCo-SP-0728	42	42DAV	Extruder Startup valve DAV - 42A404	1. Remove DAV plug and clean excessive polymer leak. 2. Remove DAV/SUV housing for screw removal. 3. Replace hydraulic cylinder. 4. Hydro blast DAV to remove degraded polymer. ---------- Check Notification # 11861430 and confirm with Shafi. 15.JUN.2020. BA	Rotating	OEM-SC
1.1	SPCo-SP-0729	42	42A405	Screen pack changers	1. Remove screen changer housing for screw removal. 2. Remove sliders to clean and lubricate. 3. Hydro blast S/C after removal to remove degraded polymer. 4. Replacement of screen elements (independent from shut-down activity). 5. Drain hydraulic fluid from cylinders. 6. Disconnect Hydraulic oil supply and return hoses. 7. Replace hydraulic oil hoses.	Rotating	OEM-SC
1.1	SPCo-SP-0730	42	42T90	SPC/DAV Hydraulic system	Change the Hydraulic oil.	Rotating	OEM-SC
1.1	SPCo-SP-0731	42	42A409	42A409 - Die-plate	To Replace on insulation ring bolts on die plate Replace die-plate	Rotating	OEM-SC

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1.1	SPCo-SP-0732	42	42A410	Pelletizer	1. Replace O-Ring at pelletizer water box. 2. Check and repair sealing face of water box. 3. Replace all bearings, seals, and O-rings of the knife shaft bearing assembly. 4. Replace the distance bushing for angular contact bearings on shaft. 5. Knife adjustment: Check hydraulic cylinders for leakage. 6. Replace springs and O-Rings of docking pins. 7. Replace docking pin and docking cylinders on the pelletizer. 8. Check of cardan-shaft for backlash and re-lubrication. If required replace. 9. Replace coupling insert between motor and gearbox. 10. Replace of hydraulic oil filter. 11. Change hydraulic oil. 12. Replace pumps. (Refer to SPCo-SP-2507 and 2508)-to be done by Schem Team 13. Pelletizer movement: Check hydraulic cylinder for leakage: 14. Replace the gearbox bearings and inspect the gears and shafts and replace the seal. 15. Replace the Motor Bearings.	Rotating	OEM-SC
1.1	SPCo-SP-0733	42	42T85	Pelletizer hydraulic oil system	Change the Hydraulic oil.	Rotating	OEM-SC
~~1.1~~	~~SPCo-SP-2485~~	~~42~~	~~42V80~~	~~BCW~~	~~To do chemical cleaning. Notification # 11819847~~	~~Rotating~~	~~OEM-SC~~
1.1	SPCo-SP-2657	42	42A408	Die Head Housing	1. Remove Die Head Housing 2. Clean (Hydro jetting) and Inspect	Rotating	OEM-SC

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1.2	SPCo-SP-0727	42	42A203	Extruder gearbox	1. Remove all gears shafts for bearing replacement and inspection of gears. 2. Check function of lubrication system to bearings and gear. 3. Change oil and filters. 4. Replace superposition drive backstop. 5. Replace all bearings, seals, and rotary union. 6. Verify timing of shafts. 7. Inspect lube oil piping for cracks. 8. NDT shaft and gears. 9.nspect the Desch coupling 10.Replace Desch coupling bolts 11. Replace Desch coupling flexible elements (buffer) 12.Inspect / replace Friction unit	Rotating	OEM-SC
1.2	SPCo-SP-2882	42	42XM80	Extruder Motor	Solo run the motor and verify magnetic running center of the shaft so placement of the shaft position can be done when coupling to the gear box. Electrical Testing will be carried out by Siemens representative. (This job related to: Rotating) Notification # 11836378	Rotating	OEM-SC
1.3	SPCo-SP-0739	42	42X84	Pellet Dewatering Dryer	Replace the Dryer screens. Replace the Top & bottom Bearings & seals, Replace inlet filter. Inspect sprocket and replace belt.	Rotating	OEM-SC
1.3	SPCo-SP-0740	42	42X85	Pellet Dewatering Dryer	Replace the Dryer screens. Replace the Top & bottom Bearings & seals, Replace inlet filter. Inspect sprocket and replace belt.	Rotating	OEM-SC

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Unit 43, LDPE Scope

Line:	Unit 43
Machine:	ZSK 380
Machine no.:	20507540
Project no.:	64020863
SWZ:	21000
MP:	NA
UG:	1000
Polymer	LLDPE
manufactured	2009

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Extruder's System Related- Rotating Scope- Unit 43

SOW Doc Ref#	JOB ID	Unit	Tag No	Equipment Name	Scope of Work	Equipment Group	Execution Strategy
2.1	SPCo-SP-0743	43	43V80	Extruder	1. Remove screw shafts for wear measurement. 2. Hydro blast polymer from screw shafts. 3. Unstack screw shaft elements for inspection for wear & Replacement (AWR) as recommended. 4. Verify spare screw timing using roll test before installing in barrels. 5. Clean elements and NDT splines for cracks. 6. Clean and NDT screw shaft for cracks. 7. Hydro blast barrels for inspection. 8. Measure barrel wear using COBRA instrumentation. 9. Replace 7 Barrels barrels & gaskets if required due to polymer leaks. (AWR) 10. Overhaul the screw shaft seal if worn, replace the sealing set. 11. Check all heating and cooling connection piping and valves. 12. Check the instruments, N2 control unit of Meco seals. 13. Chemical cleaning by Acid flushing all barrel sections. 14. Perform leak test for cooling and heating circuits. 15. Replace Meco seals. 16. Grease the screw shaft couplings. Note ; Spare Barrel & Elements would be available If barrels would be replaced, then chemical cleaning would be not	Rotating	OEM-SC

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					required on old barrel (By other contractor)		
2.1	SPCo-SP-0745	43	43DAV	Extruder Startup valve DAV - 43A404	1. Remove DAV plug and clean excessive polymer leak. 2. Remove DAV/SUV housing for screw removal. 3. Replace hydraulic cylinder. 4. Hydro blast DAV to remove degraded polymer. ---------- Check Notification # 11861431 and confirm with Shafi. 15.JUN.2020. BA	Rotating	OEM-SC
2.1	SPCo-SP-0746	43	43A405	Screen pack changers	1. Remove screen changer housing for screw removal. 2. Remove sliders to clean and lubricate. 3. Hydro blast S/C after removal to remove degraded polymer. 4. Replacement of screen elements (independent from shut-down activity). 5. Drain hydraulic fluid from cylinders. 6. Disconnect Hydraulic oil supply and return hoses. 7. Replace hydraulic oil hoses.	Rotating	OEM-SC
2.1	SPCo-SP-0747	43	43T90	SPC/DAV Hydraulic system	Change the Hydraulic oil	Rotating	OEM-SC
2.1	SPCo-SP-0748	43	43A409	43A409 - Die-plate	To Replace on insulation ring bolts on die plate Replace die-plate	Rotating	OEM-SC

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2.1	SPCo-SP-0749	43	43A410	Pelletizer	1. Replace O-Ring at pelletizer water box. 2. Check and repair sealing face of water box. 3. Replace all bearings, seals, and O-rings of the knife shaft bearing assembly. 4. Replace the distance bushing for angular contact bearings on shaft. 5. Knife adjustment: Check hydraulic cylinders for leakage. 6. Replace springs and O-Rings of docking pins. 7. Replace docking pin and docking cylinders on the pelletizer. 8. Check of cardan-shaft for backlash and re-lubrication. If required replace. 9. Replace coupling insert between motor and gearbox. 10. Replace of hydraulic oil filter. 11. Change hydraulic oil. 12. Replace pumps. (Refer to SPCo-SP-2511 and 2512)- to be done by Schem Team 13. Pelletizer movement: Check hydraulic cylinder for leakage: 14. Replace the gearbox bearings and inspect the gears and shafts and replace the seal. 15. Replace the Motor Bearings.	Rotating	OEM-SC
2.1	SPCo-SP-0750	43	43T85	Pelletizer hydraulic oil system	Change the Hydraulic oil.	Rotating	OEM-SC
2.1	SPCo-SP-2484	43	43X80	SPC (Screen Pack Changer)	Need to Fix Polymer Leak from Screen Pack Changer Side. Notification # 11819169	Rotating	OEM-SC
~~2.1~~	~~SPCo-SP-2486~~	~~43~~	~~43V80~~	~~BCW~~	~~To do chemical cleaning. Notification # 11819888~~	~~Rotating~~	~~OEM-SC~~
2.1	SPCo-SP-2658	43	43A408	Die Head Housing	1. Remove Die Head Housing 2. Clean (Hydro jetting) and Inspect	Rotating	OEM-SC

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2.2	SPCo-SP-0744	43	43A203	Extruder gearbox	1. Remove all gears shafts for bearing replacement and inspection of gears. 2. Check function of lubrication system to bearings and gear. 3. Change oil and filters. 4. Replace superposition drive backstop. 5. Replace all bearings, seals, and rotary union. 6. Verify timing of shafts. 7. Inspect lube oil piping for cracks. 8. NDT shaft and gears. 9.nspect the Desch coupling 10.Replace Desch coupling bolts 11. Replace Desch coupling flexible elements (buffer) 12.Inspect / replace Friction unit	Rotating	OEM-SC
2.2	SPCo-SP-2483	43	43X80 - V80	Gearbox	Three bolts on the gearbox need to be repaired. Rotating Reliability engineer and Coperion vendor will have to determine the type of repair necessary. Notification # 11818912	Rotating	OEM-SC
2.2	SPCo-SP-2883	43	43XM80	Extruder Motor	solo run the motor and verify magnetic running center of the shaft so placement of the shaft position can be done when coupling to the gear box. Electrical Testing will be carried out by Siemens representative. (This job related to: Rotating) Notification # 11836379	Rotating	OEM-SC
2.3	SPCo-SP-0756	43	43X84	Pellet Dewatering Dryer	Replace the Dryer screens. Replace the Top & bottom Bearings & seals, Replace inlet filter. Inspect sprocket and replace belt.	Rotating	OEM-SC
2.3	SPCo-SP-0757	43	43X85	Pellet Dewatering Dryer	Replace the Dryer screens. Replace the Top & bottom Bearings & seals, Replace inlet filter. Inspect sprocket and replace belt.	Rotating	OEM-SC

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Unit 44, PP Scope

Line:	Unit 44
Machine:	ZSK 350
Machine no.:	20507466
Project no.:	64020861
SWZ:	14000
MP:	NA
UG:	725
Polymer	PP
manufactured	2009

Extruder's System Related- Rotating Scope- Unit 44

SOW Doc Ref#	JOB ID	Unit	Tag No	Equipment Name	Scope of Work	Equipment Group	Execution Strategy
3.1	SPCo-SP-1806	44	44X80	44V80-Extruder Die Plate (A409)	1. Replace Die Plate 2. Removed die need to send to Coperion WS for overhauling.	Rotating	OEM-SC

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3.1	SPCo-SP-1858	44	44A410	44V80-Pelletizer	1. Replace O-Ring at pelletizer water box. 2. Check and repair sealing face of water box. 3. Replace Pelletizer Knife Shaft Assembly with Warehouse stock. 4. Removed Pelletizer Knife Shaft Assembly Need to Be Overhauled (Replace all bearings, seals, and O-rings of the knife shaft bearing assembly, Replace the distance bushing for angular contact bearings on shaft) 5. Knife adjustment: Check hydraulic cylinders for leakage. 6. Replace springs and O-Rings of docking pins. 7.Replace docking pin and docking cylinders on the pelletizer. 8. Check of cardan-shaft for backlash and re-lubrication. If required replace. 9. Replace of hydraulic oil filter. 10. Change hydraulic oil. 11. Pelletizer movement: Check hydraulic cylinder for leakage:	Rotating	OEM-SC
3.1	SPCo-SP-1859	44	44X92	44V80- Throttle Valve	1. Remove DAV plug and clean the excessive polymer leak. 2. Remove DAV/SUV housing for screw removal. 3. Replace hydraulic cylinder. 4. Hydro blast DAV to remove degraded polymer.	Rotating	OEM-SC
3.1	SPCo-SP-1860	44	44X93	44V80- Start Up Valve (DAV)	1. Remove DAV plug to clean the excessive polymer and inspection. 2. Remove DAV/SUV housing for screw removal. 3. Replace hydraulic cylinder soft kits. 4. Hydro blast DAV to remove degraded polymer.	Rotating	OEM-SC

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3.1	SPCo-SP-1861	44	44X94A	44V80- Screen Pack Changer A	1. Drain hydraulic fluid from cylinders. 2. Disconnect Hydraulic oil supply and return hoses. 3. Remove screen changer housing for screw removal. 4. Hydro blast S/C after removal to remove degraded polymer. 5. Remove sliders to clean and lubricate 6. Replacement of screen elements 7. Replace hydraulic oil hoses	Rotating	OEM-SC
3.1	SPCo-SP-1862	44	44X94B	44V80- Screen Pack Changer B	1. Drain hydraulic fluid from cylinders. 2. Disconnect Hydraulic oil supply and return hoses. 3. Remove screen changer housing for screw removal. 4. Hydro blast S/C after removal to remove degraded polymer. 5. Remove sliders to clean and lubricate 6. Replacement of screen elements (independent from shut-down activity). 7. Replace hydraulic oil hoses	Rotating	OEM-SC

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3.1	SPCo-SP-1864	44	44X80	44V80-Extruder (Zone/Barrels)	1. Disconnect/Connect Barrel Cooling Water (BCW) supply and return connections from/to the barrels. 2. Disconnect/Connect HP steam supply and condensate return connections from/to the barrels. 3. Remove screw shafts for wear measurement. 4. Hydro blast polymer from screw shafts. 5. Unstack screw shaft elements for replacement due to wear. 6. Verify spare screw timing using roll test before installing in barrels. 6a; Screw & Elements would be available for replacement and if required , these would be replaced.(AWR) 7. Clean elements and NDT splines for cracks. 8. Clean and NDT screw shaft for cracks. 9. Remove barrels and Hydro blast for inspection. Kindly confirm whether required leak test for barrel. (It will be evaluated after the barrels inspection as per rotation equipment department comment) 9a. Barrels 2 to 9 is recommended for Replacement. (AWR) 10. Measure barrel wear using COBRA instrumentation. 12. Overhaul the screw shaft seal if worn, replace the sealing set. 13.Replace barrels gaskets. 14. Check all heating and cooling connection piping and valves. 15. Check the instruments, N2 control unit of Meco seals. 16. Acid (Chemical Cleaning) flush all barrel sections by third party support. (Please refer the line item # SPCo-SP-2651) 17. Replace Meco seals. 18. Grease the screw shaft couplings.	Rotating	OEM-SC
3.1	SPCo-SP-1865	44	44A408	44V80- Die Head Housing Zone	1. Remove Die Head Housing 2. Inspect and Clean (Hydro jetting)	Rotating	OEM-SC

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3.1	SPCo-SP-2618	44	44T85	44V80-Pelletizer Hydraulic Oil Tank	1. Change the Hydraulic oil. 2. Tank Cleaning. 3. Suction screen/ strainer cleaning.	Rotating	OEM-SC
~~3.1~~	~~SPCo-SP-2651~~	~~44~~	~~44X80~~	~~BCW~~	~~1. Acid (Chemical Cleaning) flush all barrel sections by third party support. (This line item associated with # SPCo-SP-1864)~~	~~Rotating~~	~~OEM-SC~~
3.2	SPCo-SP-1863	44	44A203	44V80-Extruder Gear Box	1. Remove all gears shafts for bearing replacement and inspection of gears. 2. Check function of lubrication system to bearings and gear. 3. Change oil 4. Replace Auxiliary drive backstop. 5.Replace all bearings, seals, and rotary union. 6. Verify timing of shafts. 7. Inspect lube oil piping for cracks. 8. NDT shaft and gears. 9. Inspect the Desch coupling 10. Replace Desch coupling bolts 11. Replace Desch coupling flexible elements (buffer) 12. Inspect / replace Friction unit	Rotating	OEM-SC
3.2	New Job	44	44XM80	Extruder Motor	solo run the motor and verify magnetic running center of the shaft so placement of the shaft position can be done when coupling to the gear box. Electrical Testing will be carried out by Siemens representative. (This job related to: Rotating)	Rotating	OEM-SC

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3.3	SPCo-SP-1852	44	44X84	44V84- Pellet Dewatering Dryer	1. Replace the Top & bottom Bearings. 2. Replace the seals, inlet filter 3. Inspect the rotor assembly 4. Replace Belt. 5. Inspect the Sprocket 6.Inspect the screen and replaced if required. (with warehouse stock)	Rotating	OEM-SC

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Task Lists of Various Sub-Assemblies involved in Complete Overhaul of Extruder Machines

In Following section , anticipated maintenance Tasks/activities are listed for each sub-assembly involved in Overall Extruder Overhaul and scope of work of this bid document. These tasks are listed with the purpose to facilitate the bidder to understand detail scope but by no means, it must be assumed that it is covering all requirements of overhaul. Therefore, it must very clear that it does not provide any exemption to contractor for doing any essential activity relevant with the Inspection & overhaul of the machine.

As a representative, Activities against Equipments of Unit 42 units are given below. Being the identical machines & scope similarity , U43 & U44 tasks can be understood accordingly.

Equipment Number: **42V80 /EXTRUDER**

Work Order Number: **4267614**

Description of Work: **Overhauling**

WL SR. Number: **SPCo-SP-0726**

Area: **12**

System: **EXTRUDER**

Sequence Number	Phase P/E/X	Task/Activity Description
1	P	Erect the scaffolding.
2	E	Arrange the material and the spares.
3	E	LTT verification and permit approval.
4	E	Remove all the instruments.
5	E	Breaks loose the screw tips.
6	E	Pull out the screw shafts.
7	E	Isolate steam completely.

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8	E	Disconnect all the cooling and steam lines.
9	E	Remove the barrels
10	E	Clean all the head surfaces, flanges & sealing surfaces.
11	E	Hydro blast polymer from screw shafts.
12	E	Unstack screw shaft elements for inspection for wear.
13	E	Clean and NDT screw shaft for cracks.
14	E	Hydro blast barrels for inspection.
15	E	Measure barrel wear using COBRA instrumentation.
16	E	Inspect and Install the barrels
17	E	install the new screw elements into the shaft
18	E	Verify spare screw timing using roll test
19	E	install the screw shaft into the barrels
20	E	Replace the screw shaft sealing set(Meco seals).
21	E	Check all heating and cooling connection piping and valves.

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22	E	Perform leak test for cooling and heating circuits.
23	E	Check the instruments, N2 control unit of Meco seals.
24	E	Grease the screw shaft couplings.
25	E	Connect all the piping to the process section and hopper.
26	E	Re connect all the instruments/electrical connection.
27	E	clean all areas and close permit.

Equipment Number: **42DAV/ Extruder Startup valve DAV - 42A404**
Work Order Number: **4267611**
Description of Work: **OVERHAULING**
WL SR. Number: **SPCo-SP-0728**
Area: **12**
System: **EXTRUDER**

Sequence Number	Phase P/E/X	Task/Activity Description
1	P	Erect the scaffolding.
2	E	Arrange the material and the spares.
3	E	LTT verification and permit approval.
4	E	loose the SPC/SUV flange connection.
5	E	Remove all the hydraulic hoses, Rheometer.

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6	E	Rig up the SPC housing and transport to lay down area.
7	E	Hydro jet and clean the SPC housing.
8	E	Remove the safety guard.
9	E	Dis connect the instruments.
10	E	Dis assemble the rack and studs.
11	E	Support the upper slider and pull it out.
12	E	Support the lower slider and pull it out.
13	E	Clean all the internals, dress up the sliders.
14	E	Install the lower slider.
15	E	Install the upper slider.
16	E	Assemble the studs and rack.
17	E	connect the instruments.
18	E	fix back all the hydraulic hoses, Rheometer.
19	E	clean all area and close permit

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Equipment Number: **42A405/ Screen pack changers**

Work Order Number: **4267608**

Description of Work: **Overhauling**

WL SR. Number: **SPCo-SP-0729**

Area: **12**

System: **Extruder**

Sequence Number	Phase P/E/X	Task/Activity Description
1	P	Erect the scaffolding.
2	E	Arrange the material and the spares.
3	E	LTT verification and permit approval.
4	E	Loose the SPC/SUV flange connection.
5	E	Drain hydraulic fluid from cylinders.
6	E	Remove all the hydraulic hoses, Rheometer.
7	E	Rig up the SPC housing and transport to lay down area.
8	E	Hydro jet and clean the SPC housing.
9	E	Remove the safety guard.
10	E	Dis connect the instruments.
11	E	Dis assemble the rack and studs.
12	E	Support the upper slider and pull it out.

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13	E	Support the lower slider and pull it out.
14	E	Clean all the internals, dress up the sliders.
15	E	Install the lower slider.
16	E	Install the upper slider.
17	E	Assemble the studs and rack.
18	E	Tighten the piston bolts.
19	E	Replace screen elements
20	E	SPC housing transport to site
20	E	install SPC housing at location
21	E	Replace hydraulic oil hoses.
22	E	Remove LTT
23	E	clean all areas and close permit

Equipment Number: **42T90 / SPC/DAV Hydraulic system**
Work Order Number: **4267613**
Description of Work: **Change the Hydraulic oil.**
WL SR. Number: **SPCo-SP-0730**
Area: **12**
System: **EXTRUDER**

Sequence Number	Phase P/E/X	Task/Activity Description
1	P	Arrange the oil drums at location
2	E	LTT verification and permit approval.
3	E	Drain the Hydraulic oil.

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4	E	clean the Tank
5	E	Replace the Hydraulic oil.
6	E	clean all area and close permit

Equipment Number: **42A409 - DIE-PLATE**
Work Order Number: **4274065**
Description of Work: **REPLACE DIE-PLATE**
WL SR. Number: **SPCo-SP-0731**
Area: **12**
System: **EXTRUDER**

Sequence Number	Phase P/E/X	Task/Activity Description
1	P	Erect the scaffolding.
2	E	LTT verification and permit approval.
3	E	Remove Die plate
4	E	Replace new die plate
5	E	clean all areas and close permit

Equipment Number: **42A410 / PELLETIZER**
Work Order Number: **4267610**
Description of Work: **OVERHAULING**
WL SR. Number: **SPCo-SP-0732**
Area: **12**
System: **EXTRUDER**

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Sequence Number	Phase P/E/X	Task/Activity Description
1	P	Erect the scaffolding.
2	E	Arrange the material and the spares.
3	E	Dismantle the gear box enclosure.
4	E	LTT verification and permit approval.
5	E	Remove all the instruments.
6	E	Remove the flexi hose...
7	E	Remove the knife shaft bearing assembly.
8	E	Lift up the pelletizer and transport outside.
9	E	Replace gearbox bearings / seals
10	E	Clean all the parts.
11	E	Replace the bearings and assemble.
12	E	Pelletizer trolly transport to site
13	E	Position and fix Pelletizer
14	E	Fix back the flexi hose...

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15	E	install all the instruments.
16	E	clean all area and close permit

Equipment Number: **42T85 / Pelletizer hydraulic oil system**
Work Order Number: **4267612**
Description of Work: **Change the Hydraulic oil.**
WL SR. Number: **SPCo-SP-0733**
42 **Area:**
System: **EXTRUDER**

Sequence Number	Phase P/E/X	Task/Activity Description
1	P	Arrange the oil drums at location
2	E	LTT verification and permit approval.
3	E	Drain the Hydraulic oil.
4	E	clean the Tank
5	E	Replace the Hydraulic oil.
6	E	clean all area and close permit

Equipment Number: **42A408 -DIE HEAD HOUSING**
Work Order Number: **4267609**
Description of Work: **INSPECTION**
WL SR. Number: **SPCo-SP-2657**
Area: **12**

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System: **EXTRUDER**

Sequence Number	Phase P/E/X	Task/Activity Description
1	P	Erect the scaffolding.
2	E	LTT verification and permit approval.
3	E	Remove all the piping on die plate.
4	E	Break loose die head housing, measurement...
5	E	Remove the die head housing.
6	E	clean the die head housing.
7	E	Install die head housing.
8	E	clean all areas and close permit

Equipment Number: **42A203 / GEARBOX**
Work Order Number: **4267394**
Description of Work: **OVERHAULING**
WL SR. Number: **SPCo-SP-0727**
Area: **12**
System: **EXTRUDER**

Sequence Number	Phase P/E/X	Task/Activity Description

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1	P	Erection of the scaffolding.
2	P	Prestaging of the tools and spares.
3	E	Verification of LTT and permit approval.
4	E	Install blinds as per operation blind list
5	E	Drain the lube oil from the gear box.
6	E	Dismantle the back stop and the cover.
7	E	Dismantle the friction part Desch coupling.
8	E	Remove the top covers of the gear box.
9	E	Remove all the lube oil piping.
10	E	Remove all the instruments.
11	E	Dismantle the input shaft bearing.
12	E	Remove the first and second shafts out of the gear box.
13	E	Remove 1701, 1752 & 1802 shafts.
14	E	Clean all the shafts and the gears.
15	E	MPI of the shafts and gears.

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16	E	Remove the upper distribution shaft.
17	E	Remove the output shafts. 2303 & 2603.
18	E	Lift out the planetary stage with T2 bearing.
19	E	Lift out the lower distribution shaft.
20	E	Dismantle the lower distribution shaft.
21	E	Dismantle the planetary gear.
22	E	Remove bearings on the shafts.
23	E	Clean all the gears and MPI.
24	E	Install the bottom distribution shaft. (Hydraulic nut).
25	E	Install short output shaft. T8.
26	E	Install planetary stage with T2,Hirth coupling of the long output shaft.
27	E	Install the long output shaft front part.
28	E	Assemble the upper distribution shaft.
29	E	Couple the sun pinion .
30	E	Install the fix speed input shaft.

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31	E	Install shaft 1802.
32	E	Install variable speed.
33	E	Install back all the piping.
34	E	Install back all the instruments.
35	E	Install the lubrication pipes.
36	E	Install both the top covers.
37	E	Installation clutch, Coupling the output shaft.
38	E	Filling of lube oil & Start lube oil system.
39	E	Cold alignment.
40	E	Clean all areas & Close the permit.
41	p	Remove the scaffolding.

Equipment Number: **42XM80 / Extruder Motor**
Work Order Number: **4235727**
Description of Work: **Solo Run & Shaft Magnetic Verification**
WL SR. Number: **SPCo-SP-2882**
Area: **12**
System: **EXTRUDER**

Sequence Number	Phase P/E/X	Task/Activity Description

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1	E	Remove LTT and permit approval.
2	E	Deblinding
3	E	Dismantle the scaffolding.
4	E	Clean the area
5	E	Solo run the motor
6	E	couple Motor to the gear box
7	E	verify magnetic running center of the shaft
8	E	close permit.

Equipment Number: **42X84 / PELLET DEWATERING & DRYER**
Work Order Number: **4267398**
Description of Work: **OVERHAULING**
WL SR. Number: **SPCo-SP-0739**
Area: **12**
System: **EXTRUDER**

Sequence Number	Phase P/E/X	Task/Activity Description
1	P	Erect scaffolding.
2	E	Isolate the dryer.

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3	E	LTT verification and permit approval.
4	E	Open the dryer access door & clean thoroughly.
5	E	Remove the screens and clean thoroughly.
6	E	Support the rotor.
7	E	Remove the drive guard.
8	E	Remove the rotor sheeve.
9	E	Remove the upper bearing
10	E	Install the new bearing.
11	E	Sqare the bearing holding flange.
12	E	Remove the bottom bearing and seal.
13	E	Install the bottom bearing and seal.
14	E	Install the screens.
15	E	Secure the splash guard and the access door.
16	E	Install the rotor sheeve.

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17	E	Install the new belts and tension the belts.
18	E	Fix back the motor base and the guard.
19	E	Replace the air filter.
20	E	Clean the area and close the permit.
21	E	Remove the scaffolding.

Equipment Number: **42X85 / PELLET DEWATERING & DRYER**
Work Order Number: **4267599**
Description of Work: **OVERHAULING**
WL SR. Number: **SPCo-SP-0740**
Area: **12**
System: **EXTRUDER**

Sequence Number	Phase P/E/X	Task/Activity Description
1	P	Erect scaffolding.
2	E	Isolate the dryer. LTT.
3	E	LOTO verification and permit approval.
4	E	Open the dryer access door & clean thoroughly.
5	E	Remove the screens and clean thoroughly.
6	E	Support the rotor.

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7	E	Remove the drive guard.
8	E	Remove the rotor sheeve.
9	E	Remove the upper bearing
10	E	Install the new bearing.
11	E	Align the bearing holding flange.
12	E	Remove the bottom bearing and seal.
13	E	Install the bottom bearing and seal.
14	E	Install the screens.
15	E	Secure the splash guard and the access door.
16	E	Install the rotor sheeve.
17	E	Install the new belts and tension the belts.
18	E	Fix back the motor base and the guard.
19	E	Replace the air filter.

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20	E	Clean the area and close the permit.
22	X	Remove the scaffolding.

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Sub-Section-3; Timelines (Available Maintenance Windows)

Maintenance window as per L-2

- Available maintenance window to perform all Inspection & overhaul activity is 31 days for Each unit.
  - Unit 42; will be handed over for maintenance on 4th day of decommissioning
  - Unit 43; will be handed over for maintenance on 4th day of decommissioning
  - Unit44 ; will be handed over for maintenance on 4th day of decommissioning

Note ; However, this 31-day window is the Maximum available limit. It is desired that contractor must suggest & devise a plan to finish the work well before with in this maximum available time , in order to have sufficient cushion for verification & re-testing and to encounter any contingency.

In Detailed Planning phase , Schem may review the system's handing over dates and schedule will be accordingly updated.

It is also note-worthy that it is a level 2 plan and parallel activities has not yet integrated. In detail planning phase TA with engagement of OEM & contractor's planning team's support will integrate detailed schedule for best possible scenarios.

Some Key aspects to be Noted;

- For Each Unit , after dismantling of process section parts , BCW piping will go under chemical cleaning. *By Separate contractor*
- For Each Unit after dismantling of Process section parts , Steam circuit spools would be dismantled , sent to temporary workshop at site, valves would be replaced and returned to site and spools refitted again. *By Separate contractor*
- So, while performing above jobs , area around screw & barrel would not be available for rotary contractor. However, Gear box end , Tail end would be available.

These jobs have been explained separately for further understanding on schedule impact in section-6 below.

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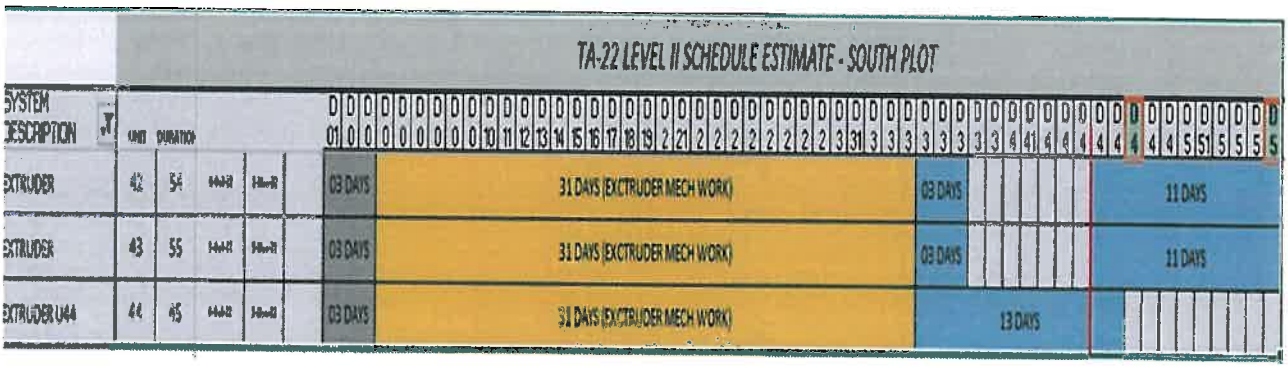

Sub-Section-4; Requisites of Technical Proposal

- Providing a detailed T/A schedule in P6 showing start date, detailed sequence of activities, end date, crew sizes and craft mix. Schedule can be later on improved during TA detailed planning phase , Keeping in view the work density & parallel works in Finishing buildings(Extruder's Buildings).
- All work is to be planned and scheduled to complete as soon as possible
- Contractors shall submit the TA & Industrial Experience certificate for Extruder's works.
- Contractors will submit Method statement with technical bid, which can be further modified / updated after award of contract & necessary review from COMPANY's technical team.
- Contractor shall provide TA Org Chart & Manpower Loading , Equipment Manpower Chart , CV's of Supervisors who will look after the extruder Works.
- Responsibility Matrix ; Contractor will also provide the information about Support ,Tools, Manpower & equipment Resources , for which contractor will take the responsibility and what is required from Schem or Schem's Subcontractor

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Sub-Section-5

; Parallel Scopes (Extruder Building Jobs to be carried out independently by Schem or Schem's contractor, Not part of this scope)

Purpose of this section is to identify the possible holdups, slowdowns , distractions resulted from the parallel works in close proximity on the same system which may not be the direct responsibility of the OEM & overhaul team for Rotary works at Extruder, But still being the essential part of maintenance scope for extruder in TA duration , these jobs has to be attended. It will not only enlighten about areas of interfaces & coordination among various stake holders but also will explicate the work density around the area. We have filtered out those tasks which will be carried out in premises of Finishing building and will have some kind of interface , dependency, or association with Extruder Rotary overhaul. Responsibility of these parallel works would though be bestowed to other contractors or Schem's own maintenance teams , But to ensure a smooth transition , schedule integration , and frictionless interface among muti performing groups , this factor should be measured , assessed and accommodated in calculation of schedule & resources so that target scope can be accomplished safely & timely without any compromise over quality and without any masked surprises.

In our scope review discussions in Pre-Bid phase , TA planning team already have explained this aspect in detail to draw attention on the scope density around extruder machine by different work groups. , so that while working on schedule & resource estimations , contractor can clearly classify high , medium or low interface areas. It will ensure, that the aspect of accommodating and provision of necessary maintenance window to different parallel work group activities don't get neglected.

Some typical examples (detail list also provided in later part of this section) of interface are as under.

- Main Motor swapping activities & Solo Run
- Exchangers cleanings & pressure tests in extruder system in finishing buildings
- Drums Inspections

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- Chemical cleaning of BCW
- Replacement of Valves & steam traps in steam & condensate system around Barrel & screw section

Total Summary of Parallel Jobs in Finishing Building Around Extruder Overhaul Works

Work Category	Equipment Type	42	43	44	Total	Nature of Work
Fixed Equipment	Exchanger	5	5	5	15	Bundle Pulls, Tubes NDT, Pressure Test
	Drum	5	5	5	15	Cleaning, Inspection, NDTs
	Piping	3	3	3	6	Replacement of Valves & Steam Traps-Steam & condensate System, Chemical cleaning BCW Loop (Hot Works- Approx. 75 jobs each unit)
	Sub-Total-Fixed	13	13	13	39	
Instrument Works	Sub-Total-Instruments	1	1	3	5	Level Switches, Miscellaneous SIS
Electrical Works	Electrical System	2	2	0	4	Exciter Panels Inspection & overhaul
	Motor	7	7	6	20	Dismantling, Reinstallation after Overhaul, Electrical testing & alignments
	Sub-Total-Electrical	9	9	6	24	
All Parallel works in Finishing Building Ground Floor		***23***	***23***	***22***	***68***	

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Parallel Scope To be Carried out In Extruder Building by Schem's Other Contractors

Extruder Systems- Parallel Fixed Equipment scope, Piping Work , Drums , Exchangers Inspections etc.

*Location	FB (Finishing Building Ground Floor)

Total Jobs 39

Serial Number	Unit	Tag No	Equipment Name	Equipment Group	Equipment Type	Execution Strategy	*Location	Interface nature & Misc. Remarks
SPCo-SP-0008	44	44X80	44V80-Extruder	Fixed	Piping	MN-SC	FB	Isolation Valves & Steam Traps Replacement of HP/Condensate System-Piping & Hot work
SPCo-SP-0009	44	44X80	44V80-Extruder	Fixed	Piping	MN-SC	FB	Inspect & Clean All Strainers in HP steam system
SPCo-SP-0049	42	42X80	Extruder Zones HP Steam	Fixed	Piping	MN-SC	FB	Steam/Condensate Valves Replacements- Barrel Zone-Hot Works
SPCo-SP-0050	43	43X80	Extruder	Fixed	Piping	MN-SC	FB	Steam/Condensate Valves Replacements- Barrel Zone-Hot Works
SPCo-SP-0076	42	42T85	Die Plate Hydraulic Oil Reservoir	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0077	42	42T90	SPC Hydraulic Oil Tank	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0081	43	43T81	Main Motor LO Reservoir (Extruder)	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0082	43	43T85	Die Plate Hydraulic Oil Reservoir	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0083	43	43T90	Hydraulic Oil Tank (Extruder)	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0099	42	42D80	Extruder Feed Hopper	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0100	42	42D84	Barrel Cooling Water Drum (Extruder)	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0110	42	42E87	Barrel Cooling Water Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Bundle Pull Out, Chemical Cleaning, NDT of Tubes, Pressure Testing

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SPCo-SP-0140	43	43D80	Extruder Feed Hopper	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0141	43	43D84	Barrel Cooling Water Drum (Extruder)	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0171	42	42T81	Main Motor LO Reservoir	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0213	42	42E82	Main Motor LO Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Hydro jetting, NDT of Tubes, Pressure Testing
SPCo-SP-0214	42	42E84	Gearbox LO Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Bundle Pull Out, Chemical Cleaning, NDT of Tubes, Pressure Testing
SPCo-SP-0215	42	42E85	Main Motor Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Air Cleaning of Tubes, NDT of tubes, Pressure Testing
SPCo-SP-0216	42	42E86	Supplementary Motor Cooler (Superposition)	Fixed	Exchanger	MN-SC	FB	Bundle Pull Out, NDT of Tubes, Pressure Testing
SPCo-SP-0236	43	43E82	Main Motor LO Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Bundle Pull Out, NDT of Tubes, Pressure Testing
SPCo-SP-0237	43	43E84	Gearbox LO Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Bundle Pull Out, Chemical Cleaning, NDT of Tubes, Pressure Testing
SPCo-SP-0238	43	43E85	Main Motor Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Air Cleaning of Tubes, NDT of tubes, Pressure Testing
SPCo-SP-0239	43	43E86	Supplementary Motor Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Bundle Pull Out, NDT of Tubes, Pressure Testing
SPCo-SP-0242	43	43E87	Barrel Cooling Water Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Bundle Pull Out, Chemical Cleaning, NDT of Tubes, Pressure Testing
SPCo-SP-0296	44	44D80	44V80-Extruder Feed Hopper	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0297	44	44D84	44V80- Barrel Cooling Water Drum	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-0302	44	44E86	44V80- Die Plate Knife Hydraulic Oil Pump Cooler	Fixed	Exchanger	MN-SC	FB	Air Cleaning of Tubes, NDT of tubes, Pressure Testing
SPCo-SP-1641	44	44E87	44V80- Barrel Cooling Water Cooler	Fixed	Exchanger	MN-SC	FB	Hydro jetting, NDT of Tubes, Pressure Testing

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SPCo-SP-1644	44	44T81	44V80- Main Motor LO Reservoir	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-1645	44	44T85	44V80- Pelletizer Hydraulic Oil Tank	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-1646	44	44T87	44V80E- Hydraulic Oil Tank	Fixed	Drum	MN-SC	FB	Vessel Cleaning, Inspection & NDT
SPCo-SP-1687	44	44E81	44V80- Main Motor LO Heater (Extruder)	Fixed	Exchanger	MN-SC	FB	Bundle Pull Out, NDT of Tubes, Pressure Testing
SPCo-SP-1688	44	44E84	44V80- Gearbox LO Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Bundle Pull Out, NDT of Tubes, Pressure Testing
SPCo-SP-1689	44	44E85	44V80- Main Motor Cooler (Extruder)	Fixed	Exchanger	MN-SC	FB	Air Cleaning of Tubes, NDT of tubes, Pressure Testing
SPCo-SP-2488	42	42X80	Steam Traps	Fixed	Piping	MN-SC	FB	Steam/Condensate Valves Replacements- Barrel Zone- Hot Works
SPCo-SP-2489	43	43X80	Steam Traps	Fixed	Piping	MN-SC	FB	Steam/Condensate Valves Replacements- Barrel Zone- Hot Works
SPCo-SP-2485	42	42V80	BCW	Fixed	Piping	MN-SC	FB	Chemical cleaning of BCW loop
SPCo-SP-2651	44	44X80	BCW	Fixed	Piping	MN-SC	FB	Chemical cleaning of BCW loop
SPCo-SP-2965	43	43V80	BCW	Fixed	Piping	MN-SC	FB	Chemical cleaning of BCW loop

Extruder System- Parallel
Instrument Scope
Total Jobs 5

*Location	FB (Finishing Building Ground Floor)

Serial Number	Unit	Operations Work Group	System	Tag No	Equipment Name	Location	Interface nature & Misc. Remarks
SPCo-SP-1085	42	PE	EXTRUDER	42LSL08621	Gear ZSK Oil Sump Level	FB	Level Switch Replacement in Gear Box
SPCo-SP-1964	43	PE	EXTRUDER	43LSL08621	Gear ZSK Oil Sump Level	FB	Level Switch Replacement in Gear Box

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SPCo-SP-2021	44	PP	EXTRUDER MAIN DRIVE	44LG-08620	44V80-Extruder Gearbox lube oil level gauge	FB	Magnetic Level Gauge Replacement-Gear Box
SPCo-SP-2452	44	PP	EXTRUDER MAIN DRIVE	44A203	44V80-Extruder Gear Box	FB	Calibration of Level Switches, SIS Interlock Instrumentation Works
SPCo-SP-2659	44	PP	EXTRUDER MAIN DRIVE	44LSL08621	Extruder gearbox	FB	Level Switch Replacement in Gear Box

Extruder System-Parallel Electrical Works

Total Jobs 24

Serial Number	Unit	Tag No	Equipment Name	Nature of Work /Job Title	Equipment Type	Work Group	Execution Owner	*Location	FB (Finishing Building Ground Floor)
								Location	Interface nature & Misc. Remarks
SPCo-SP-0109	42	42E81	Main Motor LO Heater	Inspection	Electrical System	TA	Maintenance	FB	Inspection & Testing of Electrical Heaters
SPCo-SP-0899	42	42E88	HOT OIL HEATER	Inspection	Electrical System	TA	Maintenance	FB	Inspection & Testing of Electrical Heaters
SPCo-SP-0736	42	42XM80-1	Extruder main motor	Major Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling, Reinstallation, Electrical Testing
SPCo-SP-0738	42	42XM80-3	Extruder Pelletizer motor	Major Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling, Reinstallation, Electrical Testing
SPCo-SP-0960	42	42XM80-2	Extruder Superposition motor	Major Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling, Reinstallation, Electrical Testing

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SPCo-SP-2509	42	42P M85	DIE PLATE HYDRA ULIC OIL PUMP Motor	Minor Over haul	Motor	TA	Maintenance	FB	Motors Dismantling, Reinstallation, Electrical Testing
SPCo-SP-2510	42	42P M86	DIE PLATE KNIFE HYDRA ULIC OIL PUMP Motor	Minor Over haul	Motor	TA	Maintenance	FB	Motors Dismantling, Reinstallation, Electrical Testing
SPCo-SP-2516	42	42P M90	SPC/DAV HYDRA ULIC OIL PUMP Motor	Minor Over haul	Motor	TA	Maintenance	FB	Motors Dismantling, Reinstallation, Electrical Testing
SPCo-SP-2720	42	42X M80 -1EX	42V80-EXTRUDER MAIN DRIVE MOTOR EXCITER PANEL	Minor Over haul	Motor	TA	Maintenance	FB	Exciter Panel Works-Inspection, Testing & Overhaul
SPCo-SP-0161	43	43E 81	Main Motor LO Heater (Extruder)	Inspection	Electrical System	TA	Maintenance	FB	Inspection & Testing of Electrical Heaters
SPCo-SP-2615	43	43E 88	HOT OIL HEATER	Inspection	Electrical System	TA	Maintenance	FB	Inspection & Testing of Electrical Heaters
SPCo-SP-0753	43	43X M80 -1	Extruder main motor	Major Over haul	Motor	TA	Maintenance	FB	New Motor Installation, Dismantling, Reinstallation, Electrical Testing
SPCo-SP-0754	43	43X M80 -2	Extruder Superposition motor	Major Over haul	Motor	TA	Maintenance	FB	Motors Dismantling, Reinstallation, Electrical Testing

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SPCo-SP-0755	43	43X M80 -3	Extruder Pelletizer motor	Major Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling, Reinstallation, Electrical Testing
SPCo-SP-2513	43	43P M85	DIE PLATE HYDRAULIC OIL PUMP Motor	Minor Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling, Reinstallation , Electrical Testing
SPCo-SP-2514	43	43P M86	DIE PLATE KNIFE HYDRAULIC OIL PUMP Motor	Minor Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling , Reinstallation , Electrical Testing
SPCo-SP-2518	43	43P M90	SPC/DAV HYDRAULIC OIL PUMP Motor	Minor Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling , Reinstallation , Electrical Testing
SPCo-SP-2721	43	43X M80 -1EX	43V80-EXTRUDER MAIN DRIVE MOTOR EXCITER PANEL	Minor Overhaul	Motor	TA	Maintenance	FB	Exciter Panel Works-Inspection, Testing & Overhaul
SPCo-SP-1732	44	44X M80 -3	44V80-Pelletizer MOTOR 44XM80-3	Major Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling , Reinstallation , Electrical Testing
SPCo-SP-1733	44	44X M80 -1	44V80-EXTRUDER MAIN DRIVE MOTOR 44XM8	Major overhaul	Motor	TA	Maintenance	FB	Motors Dismantling , Reinstallation , Electrical Testing

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SPCo-SP-1857	44	44X M80 -2	44V80-Auxiliary drive	Minor Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling , Reinstallation , Electrical Testing
SPCo-SP-2448	44	44P M85	44V80-Die Plate Hydraulic Pump Motor	Minor Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling , Reinstallation , Electrical Testing
SPCo-SP-2450	44	44P M86	44V80-Die Plate Knife Hydraulic Pump Motor	Minor Overhaul	Motor	TA	Maintenance	FB	Motors Dismantling , Reinstallation , Electrical Testing
SPCo-SP-2498	44	44X M80 -1EX	44V80-EXTRUDER MAIN DRIVE MOTOR EXCITER PANEL	Minor Overhaul	Motor	TA	Maintenance	FB	Exciter Panel Works-Inspection, Testing & Overhaul

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SECTION –B

SCOPE SPECIFIC AND GENERAL TERMS & CONDITIONS

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1. CONTRACTOR'S RESPONSIBILITIES, TERMS & CONDITION SECTION

The Scope of work described in this document shall be executed in accordance with the following terms and conditions , wherever it applicable to the subject job. Terms & conditions with respect to contractor's responsibilities have been listed in below documents under different sub-heads.

As a guiding document for proposal please go through following paragraphs addressing the division of responsibilities between contractor's & Schem.

CONTRACTOR's responsibilities include, but are not limited to the following:

a. General Instructions:

1) CONTRACTOR shall perform safe and timely execution of all work activities described in" CONTRACTOR's Scope".
2) Work performed by CONTRACTOR will be under the direction of "COMPANY"/ Cpchem supervision or Company's engaged specialists(OEM). As necessary, additional support or direction can be obtained from the Area Supervisor-in-charge assigned by "COMPANY".
3) CONTRACTOR shall comply with COMPANY's all General Instructions (GI) and Best Practices related to the scope of work. Copies of COMPANY General Instructions will be provided.
4) Supplying all qualified labor, supervision, tools, equipment, Cranes , alignment tools , technical support, consumables, expendables, and temporary supplies necessary for, and reasonably related to complete Extruder work.
5) Providing necessary consumable and expendable supplies in enough quality and quantity for personnel to perform the scope of work safely and efficiently.
6) All necessary cleaning tools, "COMPANY" approved sprays & chemicals would be contractor's responsibility.
7) Contractor shall perform the work on both Day & Night Shifts. Each Working Shift shall be of 12 Hours.
8) Contractor to ensure the shift turnover for critical and near critical path Equipment to be done at site
9) Providing necessary cranes, safety gears, steam & portable compressors along with relevant crews, where over required.
10) Contractor shall follow "COMPANY" HR Fatigue Policy CP # 1055. Contractor shall mobilize the personnel under their direction to comply with this policy to ensure personnel physical health without negatively affecting TA schedule or quality
11) Contractor will be responsible for Transport, Food, Tea or Water for his staff. Company will allocate the Tent Area for Lunch or Dinner

b. Actions required After PO Issuance:

12) Submit the Organization chart, defined by craft and name, all personnel required to execute and supervise the scope of work, 45 days in advance of the T/A start date as defined by "COMPANY" T/A management. CONTRACTOR will schedule personnel for required pre-T/A training at the request and timing specified by "COMPANY" T/A management and "COMPANY" Safety.

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13) After issuance of PO, contractor will be responsible to submit project manager & planning team names who will be involved with "COMPANY"'s TA planning team for joint site visits & any exchange of information. Contractor's planning team will be responsible for submitting the Lifting plans, method statements during Planning phase. This Planning team who is involved in Planning phase will not be removed or change in execution stage.
14) Support TA planning in detail Planning phase for L-5 Schedule preparation with built in margins of parallel scopes, identification of special Tools & resources , any prefabrication activities or pre-inspection of spares.
15) Support TA team to identify the resource & tools requirements from site sub-contractors in terms of manpower , craft specialties , tools , mobile Equipments
16) Contractors will submit QA/QC plan highlighting the hold points, method statement & P6 schedule with technical bid, which can be further modified / updated after award of contract.
17) Contractor will arrange receipt and transfer of all non-consumable material from the "COMPANY" T/A Warehouse to the work location. CONTRACTOR will return the balance of unused and undamaged material to the T/A warehouse after completion of work.
18) All tools, equipment, and resources are subject to initial and periodic inspection by "COMPANY" personnel to ensure safe and compliant use within the "COMPANY" facility. "COMPANY" reserves the right to reject use of any tool(s) or equipment for cause. Tool container shall be provided by Contractor.
19) Contractor shall send their Admin Co-coordinator (Arabic) for coordination with Company's Admin & Security Department for preparation of ID's etc., as and when required.
20) Contractor will get approved Torque value charts equipment wise from COMPANY's reliability and provide copy to TA Planning during planning phase, FORTY-FIVE (45) days prior to turnaround.

c. **Work Specific Instructions**

21) Contractor's will prepare the equipment for any NDT inspection up to the satisfaction level of reliability, will coordinate with reliability for inspection and will repair in accordance with the reliability's recommendation.
22) Contractors will make necessary safety arrangements & hard barricades in staging & work area.
23) Special precautions have to be taken to avoid water usage where no hydro blasting or water cleaning is required. Only manual cleaning would be done. Special Alerts would be placed by contractor on such jobs
24) Contractor will be responsible for all site coordination with Planning, Operation, Process & reliability as & when necessary to make sure that there is no lag time in between activities.
25) Contractor will inform the requirement of workshop facility, if required in planning phase.
26) Contractor will arrange all consumables , cleaning agents.
27) Keeping in view the nature of Work contractor will bring Bearing Heaters , Demagnetization arrangement , in case bearings get magnetized.

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28) As Process section , Gear Box section and other accessories are heavy parts , Contractor will arrange special experienced rigging team, all packing/temporary supports to be placed under dismantled parts ground to safeguard against dirt & scratches.
29) Contractor will inform about the requirement of site area for placing the spares in racks, repair of gear box etc.
30) Contractor will be responsible to plan the job and will also let Schem know about the preparatory work required in pre-TA.
31) In Case , if there are multiple contractors to work on the same equipment in between its own activity before final hydrotest or box up , like for parallel fixed Equipments inspections , tube cleanings , Valves & Steam traps Replacements on steam circuit works , BCW chemical cleaning , on surrounding steam & condensate systems , , Contractor will be responsible to ensure effective communication , accommodation and follow up with that contractor to ensure that no unnecessary lag occur in this interface and transition.
32) Contractor will arrange all measurement tools to record clearances & wear measurements. Contractor will be responsible for COBRA measurement tools.
33) Contractor will get the final box up certificate after completion of all activities. All this box up certificates will be handed over to TA planning.
34) Inspection & verification of all the tools & spares in advance of T.A to ensure everything is set up to meet the needs of overhaul scope.
35) All tools, equipment, and resources are subject to initial and periodic inspection by COMPANY personnel to ensure safe and compliant use within the COMPANY facility. COMPANY reserves the right to reject use of any tool(s) or equipment for cause.

d. **Attachments essential with Technical Proposal**

36) Providing a detailed T/A schedule in P6 showing start date, detailed sequence of activities, end date, crew sizes and craft mix. Schedule can be later on improved during TA detailed planning phase , Keeping in view the work density & parallel works in Finishing buildings(Extruder's Buildings).
37) All work is to be planned and scheduled to complete as soon as possible
38) Contractors shall submit the TA & Industrial Experience certificate for Extruder's works.
39) Contractors will submit Method statement with technical bid, which can be further modified / updated after award of contract & necessary review from COMPANY's technical team.
40) Contractor shall provide TA Org Chart & Manpower Loading , Equipment Manpower Chart , CV's of Supervisors who will look after the extruder Works.

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41) Responsibility Matrix ; Contractor will also provide the information about Support ,Tools, Manpower & equipment Resources , for which contractor will take the responsibility and what is required from Schem or Schem's Subcontractor

e. **Safety Instructions**

42) Providing full time Safety personnel whose sole responsibility shall be to ensure CONTRACTOR personnel conduct work in accordance with Rules and Regulations of "COMPANY", and that good safe work practices are utilized at all times.
43) Performing work in accordance with "COMPANY" Safety procedures and requirements outlined in the "COMPANY" T/A EH&S Plan and compliance to all "COMPANY" General Instructions (GI). Copies of "COMPANY" General Instructions will be provided.
44) Contractor shall provide a well-trained & certified Permit receiver, Hole watch, fire watch & bottle watch.
45) Contractors will be responsible for all PPE's for his manpower.
46) Contractor will make sure that any of his labor does not exceed 16 hrs. of continuous work. Also, at every 14th day, each labor has to be given a one-day rest.
47) Safety officer's final acceptance will be after face to face interview with "COMPANY" safety department.

f. **Planning & monitoring**

48) Visiting the job site to acquaint themselves with existing conditions.
49) Contractor's Site management staff , Equipment and Leadership team like Supervisors/Foremen/Leads, Lead Planner QA/QC, etc. shall comply to the "COMPANY" plan for early mobilization as specified for necessary preparation work to understand the job , for site orientation , Crew's planning as per P6 schedule , JSA's , detailed assessment of work requirements , equipment & staff certifications and for setting up agreed temporary installations.
50) Prestaging activity to be started 3 weeks in advance.
51) CONTRACTOR shall mobilize the leadership team Fifteen (15) days ahead of start of S/D start date However, in detail Planning phase whatever the date & strength is agreed & approved by TA Planning Superintendent or TA Manager, would be required to be mobilized according to Final L-4 schedule.
52) Contractors will submit daily progress report to TA planning, highlighting the work activities of the day, next day plan, equipment & manpower count, HSE statistics of the site. CONTRACTOR will also issue daily work schedule based on two shifts of 12 hours each
53) Contractor shall provide the On-Site Peak load & Org Chart with their technical manpower also on daily progress report.
54) CONTRACTOR Shall ensure the shift relieving to be done at job site for critical path equipment's.
55) At the end of the TA activity, a detailed report shall be submitted to Company by Contractor. Contractor's Final invoices will be approved on submission of consolidated dossier of NDT reports & Activity Report along with lesson learnt.

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g. **Handling of Additional & Discovery Work**

56) Contractor to mobilize sufficient resources like Extruders specialists , shift supervisors , technicians, tools & equipment to support operations in Decommissioning & Startup phase till Feed In. Manpower mobilization for this crew shall be applicable as part of lumpsum cost and will be applicable from Shutdown start date. However, for any early support activity for operations, contractor will ensure early mobilization of the required crafts & resources as demanded. Operation support requirements for Shutdown period and before or after Shutdown period will be evaluated in Pre-TA phase. Any Additional support outside the TA window will be paid separately on Day rate Basis.
57) For any additional work, please provide us unit rates for manpower craft wise and for all the Equipments like cranes, lift trucks, hydro jetting m/c, pressure testing pumps, bundle pullers etc.
58) Any discovery work shall be invoiced separately and shall be based on "COMPANY" approved CMF form.

h. **Restricted Access - Avoid Unnecessary Movement**

59) Advising and warning CONTRACTOR personnel that Operations Central Control Rooms and other Operations Structures within the "COMPANY" facility are not to be entered or accessed FOR ANY REASON without operations approval and escort. Any unescorted CONTRACTOR found inside a Central Control Room or other Operations Structure is subject to removal and banishment from the "COMPANY" work site.
60) Advising and warning CONTRACTOR personnel that the Central Maintenance Shops and Maintenance Structures within the "COMPANY" facility are not to be entered or accessed FOR ANY REASON without maintenance approval and escort. Any unescorted CONTRACTOR found inside a Maintenance Shop or other Maintenance Structure is subject to removal and banishment from the "COMPANY" work site.
61) CONTRACTOR shall ensure presence of their personnel to the designated work area only. Any Person found in or around unrelated plant area, shall be subject to immediate removal from Plant. CONTRACTOR shall provide a suitable replacement immediately to avoid any effect on work progress.

i. **House Keeping**

62) Maintaining a job site that is clean and free of debris at all times. After completion of work, leave the area as clean as found.
63) Discarding all coke, sludge, damaged parts, packing/ scrap metals, and all other general rubbish from maintenance activities into designated waste containers provided by COMPANY. The CONTRACTOR shall make arrangements to shift waste containers to temporary waste storage areas designated by COMPANY.

2. **SCHEM IS RESPONSIBLE FOR:**

a) isolation and Decontamination of Equipment/system.
b) Electrical & Instrument disconnections

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c) System Blinding which or Common Blinding for jobs which have interface with other Contractor's scope.
d) Any Insulation & Refractory removal , repair or Installation activity
e) All sort of Painting work.
f) Any type of hot work involving cutting, grinding & welding as recommended by reliability & inspection team.
g) Erection of all scaffolds and revisions as required by CONTRACTOR
h) Provide drawings, blinds, gaskets, spares or any other materials and consumables required to facilitate the subject job.
i) Provide utilities such as water, lights for internal and external use.
j) Scaffolding, Insulation and any type of welding and grinding works recommended by Inspection team or OEM.
k) Office facilities for CONTRACTOR (as decided by Schem T/A management, either Blast Resistant Module for essential on-site personnel, or workspace in the T/A office for non-essential personnel)
l) All NDT Inspections like verification of work quality and final approval of cleaning & repair work.
m) Tent with tables and chairs for CONTRACTOR lunch and rest break
n) Prayer facilities in designated work locations
o) Drinking water around the clock
p) All temporary lighting for confined space entry (IF required by GI, Class-1 Div-1)
q) All EHS meters and monitors required by General Instruction
r) Rest Shelters in designated work locations
s) Smoke Shelters in designated work locations
t) Sanitary facilities (toilets and hand wash stations)
u) All non-consumable material required to perform the scope of work
v) Making Extruders ready to blind

3. ***DRAWINGS, SPECIFICATIONS & PROCEDURES***

Specifications, standards, procedures, drawings and Company's General Instructions shall apply to Engineering and construction works when applicable. All above documents shall be collected from Turnaround Planning Section.

4. GUIDELINES

4.1 All work should follow COMPANY Standards and Specifications.

4.2 All work outside the above codes, standards and specifications shall follow COMPANY guidelines and practices.

4.3 CONTRACTOR shall comply with COMPANY Policies, General Instructions and Work Procedures regarding the use of Personal Protective Equipment's (PPE).

4.4 CONTRACTOR shall comply with COMPANY Safety and Security program Exhibit III (more details can be sought out later by CONTRACTOR as applicable)

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4.5 COMPANY may from time to time and at any time require CONTRACTOR to suspend performance hereunder completely or partially for whatever length of time COMPANY may elect. The time for completion shall be extended by each period that the completion date is necessarily delayed by (a) the actions or omissions of COMPANY or another independent contractor that is directly responsible to COMPANY (unless such delay is due to CONTRACTOR's actions or failures to act). In case COMPANY requires suspending the performance of work, CONTRACTOR shall be given reasonable delivery extensions.

4.6 CONTRACTOR shall provide a qualified safety officer when there is work in the Plant. This safety officer shall not do any other work, other than safety.

4.7 Anything not listed in the CONTRACTOR's offer / Exhibit – I, Scope of Work, but appearing on the drawings / attachments shall be completed by CONTRACTOR, with no additional charges.

4.8 CONTRACTOR should utilize COMPANY recommended sub-contractors / manufacturers

5.GENERAL REQUIREMENT

The Section 3.0 above shall prevail in the event of any inconsistency on the text hereunder.

5.1 COMPANY's REPRESENTATIVE

COMPANY will maintain, as required, a representative hereafter called the "COMPANY Representative". COMPANY Representative will provide liaison between COMPANY and CONTRACTOR and represent COMPANY in all matters covered by this Contract, including negotiating and approving changes.

COMPANY's Representative will be the only COMPANY employee authorized to represent COMPANY with respect to this Contract. Examples of his functions are to:

5.1.1 Review and approve designs, specifications, requisitions and purchase orders as required by this Contract.

5.1.2 Establish and maintain field liaison between CONTRACTOR's Representative and COMPANY.

5.1.3 Review CONTRACTOR's construction schedule and field performance.

5.1.4 Make such inspections of the Facility during construction, as COMPANY may desire in order to check the progress of the Work and quality of workmanship and Materials.

5.1.5 Negotiate and approve field changes.

5.1.6 Review CONTRACTOR's administrative procedures.

5.1.7 If, in COMPANY's considered opinion, the conduct or performance of any of CONTRACTOR's personnel is unsatisfactory in any way, CONTRACTOR, if COMPANY so requests, shall at CONTRACTOR's sole cost and expense promptly replace such person or persons with personnel suitably qualified.

At the start of Work, CONTRACTOR shall develop procedures for handling

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correspondence, Material orders, quotation analyses, drawings, schedules and other administrative or engineering aspects of Work to the satisfaction of COMPANY.

5.2 CONTRACTOR's PERSONNEL

CONTRACTOR shall assign a full-time Project Manager (hereafter called "CONTRACTOR Representative") to provide liaison between CONTRACTOR and COMPANY and to represent CONTRACTOR in all matters covered by this Contract, including negotiating and approving COMPANY's authorized changes. The CONTRACTOR's Representative shall not be changed during the course of the Work unless COMPANY approves such change in writing.

When fieldwork is in progress CONTRACTOR's Representative shall act in full charge of CONTRACTOR's fieldwork and maintain field liaison between CONTRACTOR and COMPANY's Representatives. Examples of his functions are to:

5.2.1 Negotiate and approve for CONTRACTOR, COMPANY's field changes authorized by COMPANY.

5.2.2 Represent CONTRACTOR in matters pertaining to construction performance and quality, scheduling, administrative procedures and financial controls

5.2.3 Represent CONTRACTOR during all required tests.

5.2.4 Coordinate with COMPANY Project Engineer on all job activities

5.2.5 Remove any person from CONTRACTOR staff in case the same is not fully complying with the COMPANY requirements or when requested by COMPANY Representative and shall provide a suitable replacement within a week time and without affecting the work progress.

5.3 KEY PERSONNEL

CONTRACTOR shall maintain the following persons at the job site on a full-time basis at all times during the course of the Work and shall not remove or reassign such personnel without COMPANY's prior approval:

a. CONTRACTOR's Project Manager
b. Safety Engineer
c. Quality Control Engineer.
d. Work Permit Receiver
e. Direct working resources and staff

5.4 SPECIAL TOOLS FOR EQUIPMENT INSTALLATION

All special tools and/or equipment required for installation and/or maintenance of equipment shall be furnished by CONTRACTOR.

5.5 WORK PERMITS

At least thirty (30) days prior to mobilization, CONTRACTOR shall familiarize himself with COMPANY's Plant Operations and Maintenance Work Permit procedures and CONRACTOR's workers shall be trained to receive Work Permits in a timely manner. After approval by COMPANY, CONTRACTOR shall comply with this Work Permit procedure. COMPANY will not be responsible for delays due to CONTRACTOR's failure

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to submit its Work Permits in a timely fashion or failure to comply with the approved Work Permit procedure.

5.6 FIELD INSPECTION

5.6.1 Inspection by COMPANY

COMPANY may visit and inspect any and all of the Work and Materials at any time, and CONTRACTOR shall provide safe and proper facilities therefor. CONTRACTOR shall at all times during the performance of the Work keep a competent supervisor, fluent in the English language, in the immediate vicinity of the Work areas to receive communications from COMPANY and to supervise the performance of this Contract.
COMPANY shall inspect all works and witness all tests. Prior notice shall be given to COMPANY for any inspection or witnessing as:

a. THREE (03) working days for inside the COMPANY facility.

b. FOURTEEN (14) working days for outside the COMPANY facility.

c. Testing requirements shall be based on COMPANY inputs.

d. CONTRACTOR to determine hold points for inspection and test witnessing.

e. COMPANY reserves the right to assign any 3rd party inspection agency, as needed.

5.6.2 CONTRACTOR's Inspection Responsibility

CONTRACTOR shall be solely responsible for thorough inspection and testing of the Work and for the quality of the Work. COMPANY's inspection of, testing of, approval of, or agreement to the performance of any part of the Work shall in no way relieve CONTRACTOR of its responsibility for the Work. CONTRACTOR shall:

5.6.2.1 Submit Inspection Testing Plan for COMPANY review and comments.

5.6.2.2 Must submit their QA/QC for review and approval prior to awarding of contract.

5.6.3 Inspection by CONTRACTOR

Whenever any part of CONTRACTOR's Work depends on existing work or work or Material provided by COMPANY or others, CONTRACTOR shall inspect and measure such other work or Material and promptly notify COMPANY of each defect or discrepancy in such other work or Material that may render it unsuitable for proper execution of CONTRACTOR's Work or proper functioning of the Facility. If CONTRACTOR fails to notify COMPANY's Representative of any such defect or

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discrepancy before performing CONTRACTOR's independent Work, and such defect or discrepancy would have been discovered in the course of a reasonably thorough visual inspection and measurement, COMPANY may condemn the Work or Material involved and CONTRACTOR shall correct such defect or discrepancy on the same basis as if it were defective Work by CONTRACTOR as per General Terms and Conditions (copy attached).

5.7 COMPLETION

5.7.1 Mechanical Completion

CONTRACTOR shall cause Mechanical Completion of the Facility to occur. Mechanical Completion shall mean that all requirements of this Contract have been met with respect to:

5.7.1.1 Construction
5.7.1.2 Safety
5.7.1.3 Ability to physically operate

Prior to Mechanical Completion, CONTRACTOR shall demonstrate to COMPANY all portions of the facility:

- have been built according to the terms of this contract
- operate as intended

5.7.2 Acceptance by COMPANY

All Work will be subject to Acceptance by COMPANY pursuant this Exhibit–I Scope of Work.

5.8 TIME FOR COMPLETION

5.8.1 Initial Time for Completion

CONTRACTOR shall cause the Facility to achieve Mechanical Completion, on or before the applicable date specified in the contract. The time for completion shall be extended only in accordance with the provisions of the Terms and Conditions. COMPANY shall reduce the time for completion only with the written consent of CONTRACTOR.

5.8.2 Failure to Maintain Schedule

If at any time during the progress of the Work, CONTRACTOR's actual progress is inadequate to meet the approved schedule and as established, COMPANY shall have the right, but not the obligation, to so notify CONTRACTOR who shall thereupon take such steps as may be necessary to remedy the inadequacy. If within a reasonable period (as determined by COMPANY and not to exceed THREE (03) working days) CONTRACTOR does not improve performance to meet the schedule, COMPANY may require an increase in labor force, number of shifts, overtime operations, or additional days of work per week without additional compensation to CONTRACTOR, to eliminate or reduce the possibility of delayed completion. COMPANY may make such requirements in

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addition to any other rights or remedies that COMPANY may have.

5.8.3 Failure to Complete on Schedule

If CONTRACTOR does not cause the Facility to achieve Mechanical Completion within the time, COMPANY may elect to take over and complete the Work pursuant to the Terms and Conditions. COMPANY may take over and complete the Work in addition to any other rights or remedies that COMPANY may have.

6. MATERIALS, SERVICES AND UTILITIES FURNISHED BY COMPANY

COMPANY shall furnish or cause to be furnished to CONTRACTOR, the following items for or in connection with performance of the Work.

6.1 **COMPANY** shall provide: Please refer clause no. 1.2 & 2.6

6.2 In addition to Clause no. 1.2, **CONTRACTOR** should provide

6.2.1 Providing a Level –II T/A schedule showing start date, sequence of activities, end date, crew sizes and craft mix. All work is to be planned and scheduled to complete as soon as possible. After award of PO contractor will submit detailed plan in Primavera

6.2.2 Arranging receipt and transfer of all non-consumable material from the COMPANY T/A Warehouse to the work location. CONTRACTOR will return the balance of unused and undamaged material to the T/A warehouse after completion of work.

6.2.3 Supplying all qualified labor, supervision, tools, equipment, technical support, consumables, expendables, and temporary supplies necessary for, and reasonably incidental to complete Repair & Cleaning of Columns

6.2.4 Providing necessary consumable and expendable supplies in sufficient quality and quantity for personnel to perform the scope of work safely and efficiently.

6.2.5 Providing, Breathing Apparatus for blinding, Air compressor, Certified & Tested Lifting & Pulling tools and tackles, Calibrated Pressure gauges, Test equipment, Safety Device, chemical hoses Hand Tools & Power Tools etc. These should meet or exceed COMPANY relevant GI's.

6.2.6 Blind lists provided in bidding package are tentative for estimation purpose. Blinding at site to be done as per Operations Blind list provided with marked up PID's. These lists will be provided at later stage after award of PO.

6.2.7 Provide forklifts and qualified forklift operators holding valid Saudi driving license. Forklift operators are required to attend COMPANY Powered Industrial Truck (PIT) training per COMPANY General Instruction. CONTRACTOR will schedule personnel for

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pre-T/A PIT training at the request and timing specified by COMPANY T/A management.

7. REPORTING REQUIREMENTS

7.1. CONTRACT DAILY REPORT

CONTRACTOR shall submit progress reports at end of each shift which provide manpower (including manual, non-manual and sub-contractors) present for work, a listing of all equipment on site (detailed by type and quantity), and any Safety related issues. Reports shall be submitted in the format established with continuation pages on forms proposed by CONTRACTOR and acceptable to the COMPANY Representative.

7.2. DAILY PROGRESS REPORT

CONTRACTOR shall submit a written daily progress report, which will cover daily field work. The report shall summarize the status of job and the overall progress achieved for the CONTRACTOR's detailed work schedule.

8. DATA REQUIREMENTS

1.1. After completion of turnaround contractor will submitted detailed report. This report will contain technical details, manpower & logistic details.

9. QUALITY CONTROL REQUIREMENTS

9.1. QUALITY PLAN

9.1.1. CONTRACTOR shall provide a comprehensive; project specific Quality Plan that identifies CONTRACTOR's procedures for Quality Control during the Construction execution phase of the Work. The Quality Plan shall be presented to COMPANY for approval at least 45 days prior to beginning turnaround. After approval by COMPANY, CONTRACTOR shall comply with requirements of the Quality Plan.

9.1.2. Should any inspection or test reveal any defect in CONTRACTOR supplied materials or in CONTRACTOR's Work, CONTRACTOR shall correct such defect at no cost to COMPANY.

9.2. QUALITY INCHARGE

CONTRACTOR shall provide a full-time QC who shall be responsible for the coordination of CONTRACTOR's construction quality surveillance, inspection, testing, and documentation activities.

10. CONSTRUCTION

10.1. All Construction Access, Construction Methods, Temporary Facilities and Work Areas shall conform to and be in compliance with COMPANY Operations, Standard Industry requirements and where applicable Royal Commission for Jubail Construction Safety requirements.

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10.2. Turnaround Execution Plan

CONTRACTOR shall develop and submit to COMPANY a detailed project specific turnaround Execution Plan at least 60 days prior to the start of turnaround.

10.3. Security Program

CONTRACTOR is responsible for the security of its workers, tools, materials and equipment (and to and from) the jobsite. All small tools and construction equipment belonging to CONTRACTOR must be clearly identified as such. Tools including personal tools are subject to inspection at the security gate upon arrival and departure.

10.4. Construction Area Limits

COMPANY shall designate the boundary limits of access roads, parking areas, storage areas, and construction areas. CONTRACTOR shall not trespass in or on areas not so designated. CONTRACTOR shall be responsible for keeping all of its personnel out of areas not designated for CONTRACTOR's use. In the case of isolated work located within such areas, CONTRACTOR shall obtain permits to enter and perform the Work. CONTRACTOR shall keep all vehicles, equipment, materials and personnel in such areas as designated by COMPANY.

10.5. CONTRACTORS Office at Site of Work

During the execution of this Contract, COMPANY will provide office for project manager & coordinator in separate or shared office building

10.6. CONTRACTOR Supplied Temporary Buildings

Any CONTRACTOR supplied temporary construction buildings shall be fire retardant and shall include fire protection equipment. The location, size(s), quantity and type(s) of temporary buildings shall be subject to COMPANY's review and approval.

10.7. Personnel Identification

CONTRACTOR's personnel and Sub-contractor personnel shall have in their possession all required, and properly validated licenses, certificates or identification badges prescribed by COMPANY or the Saudi Arabian Government.

CONTRACTOR shall wear and provide identification badges to all its employees working either directly or indirectly under its supervision. These badges must be worn conspicuously by these employees at all times when on the jobsite. CONTRACTOR shall provide Temporary badges and safety gear for visitors and delivery personnel.

10.8. Smoking

Smoking shall only be allowed in the designated smoking areas.

10.9. Dust Control

CONTRACTOR, for the duration of the Contract, shall maintain all excavations, embankments, haul roads, plant sites, waste disposal areas, borrow areas, and all other work areas free from dust, as determined by COMPANY. Industry-accepted methods of dust control suitable for the area involved, such as sprinkling, chemical treatment, tight bituminous treatment or similar methods, with COMPANY approvals, will be permitted. No separate payment will be made for dust control.

10.10. Water Pollution

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CONTRACTOR shall, at own expense, provide suitable facilities to prevent the introduction of any substances or materials into any stream, lake or other body of water which may pollute the water or constitute substances or materials deleterious to fish, wildlife and domestic stock.

10.11. Air Pollution

CONTRACTOR shall also perform the Work so as not to discharge into the atmosphere from any source whatever smoke, dust, or other air contaminants in violation of the laws, rules and regulations of the government entities having jurisdiction.

10.12. Fuels & Lubricant

CONTRACTOR shall be responsible for the proper handling, transportation, storage and use of fuels and lubricants and shall, at CONTRACTOR's sole expense, make good any damage caused by its handling, transporting, storage and use of fuels and lubricants.

10.13. Ventilating

10.13.1. CONTRACTOR shall prevent hazardous accumulations of dust, fumes, mists, vapors or gases in areas occupied during construction.

10.13.2. CONTRACTOR shall provide local ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

10.13.3. CONTRACTOR shall dispose of materials in manner that will not result in harmful exposure to persons or disrupt or otherwise effect operation of existing facilities.

10.13.4. CONTRACTOR shall ventilate storage spaces containing hazardous, volatile or high temperature sensitive materials.

10.14. Site Signs

Identification signboards and notices for safety or instruction are permitted on site only after approval of COMPANY for format, location and quantity.

10.15. Drainage

CONTRACTOR shall provide proper and adequate drainage for its construction, storage, parking and fabrication areas including the necessary piping for disposal to COMPANY ditches, or sewers. Temporary drainage facilities shall be removed upon completion of Work unless COMPANY directs to have the facilities left in place. CONTRACTOR shall be responsible for providing and operating any temporary pumps for keeping its area drained. CONTRACTOR shall furnish and place any necessary surfacing material to avoid loss of time due to muddy conditions.

10.16. Lunch and Toilet Facilities

Company shall provide necessary lunch and toilet facilities for CONTRACTOR personnel... CONTRACTOR shall provide meals to their manpower during breaks in lunch tent.

10.17. Construction Entrance

Access into COMPANY work site shall be through TA gate.

10.18. Review by COMPANY

Review and approval of CONTRACTOR's rigging, scaffolding and other construction plans by COMPANY, shall not constitute or to be construed as an assumption of

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CONTRACTOR's responsibility or liability for scaffolding or safety under the Contract or at law, and does not relieve CONTRACTOR from full compliance with its legal and contractual obligations.

10.19. Interference

It is understood that the COMPANY may itself perform Work at or near the CONTRACTOR's Work site, or have such Work performed by others. CONTRACTOR agrees to cooperate fully with COMPANY or any other Contractor performing such Work, and not to interfere with the performance of such Work.

10.20. Site Clean Up

CONTRACTOR shall maintain the site in a safe and orderly condition by daily removal and disposal of accumulated rubbish and waste material. Temporary equipment shall be removed immediately upon completion of the WORK requiring the equipment. Upon completion of the Work, CONTRACTOR shall clear the site of all remaining CONTRACTOR's temporary facilities, temporary equipment, debris, tools, and material used in the Work. Where CONTRACTOR, upon written notice from the COMPANY, fails to maintain the site in a safe and orderly condition, the COMPANY will have the site maintenance Work performed and deduct the cost from the CONTRACTOR invoice.

10.21. Heavy lifts

CONTRACTOR shall provide a **heavy lift plan for all lifts over FIVE (05) tons**, for COMPANY's review and approval.

11. ENVIRONMENTAL REQUIREMENTS

11.1. General Requirements

CONTRACTOR shall plan, execute and complete all work such that there are zero environmental incidents and no detrimental environmental impacts to the local population, workers, air, water, soil, plants and animals.

11.2. Environmental Care and Response Plan

CONTRACTOR shall submit a Project Specific Environmental Care and Response Plan in compliance with the Saudi Arabian Government, and Saudi Chevron Petrochemical Environmental Standards. The Environmental Plan shall provide specific plans and procedures to address compliance with these Standards and shall be submitted for COMPANY review prior to commencement of the Work.

11.3. Environmental Care Practices

CONTRACTOR shall perform the Work in accordance with all environmental care practices, applicable local and national rules, regulations and codes taking all reasonable precautions to protect the facility, adjacent facilities, workers and the public. CONTRACTOR shall have materials and equipment on site to minimize, control and mitigate incidences of uncontrolled releases of materials to the air, water or land.

11.4. Environmental Care Orientation Meeting

CONTRACTOR's in-Kingdom supervisory personnel, including supervisory personnel of CONTRACTOR subcontractors, shall attend an environmental care orientation meeting, prior to commencing the Work. This meeting shall last at least two (2) hours and shall be separate from any safety or security orientation.

COMPANY may, at its sole discretion, audit CONTRACTOR environmental care orientation meetings.

11.5. Accidents and spills

Accidents, spills, uncontrolled releases to air, water, and land or other environmental incidents and "near misses" shall be orally reported to COMPANY at the time of the

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incident. CONTRACTOR shall submit written reports, in a format developed with COMPANY, within twenty-four (24) hours after each incident. CONTRACTOR shall maintain a jobsite record of such environmental incidents and "near misses" which shall be submitted to COMPANY upon written request.

11.6. CONTRACTOR's Responsibility

CONTRACTOR shall be wholly responsible for construction means, methods, techniques, sequences or procedures for environmental precautions and programs in connection with the Work. COMPANY shall not, in any way, be responsible for CONTRACTOR's failure to employ such precautions.

END

EXHIBIT–I

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Method Statement

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S-CHEM TA 2022
EXTRUDER OVERHAULING
ZSK 380 (Unit 42 and Unit 43)

METHOD OF STATEMENT

PREPARED BY MAHESH RATHORE

Reviewed & Approved By:
Satyaki Mukherjee
Technical Manager (Rotating & Static)

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1. EQUIPMENT 42V80 EXTRUDER OVERHAULING

Pelletizer unit related job: -

1.1.0 Extruder operation has been stopped. pelletizer detached and need to pulled backward from the die plate.

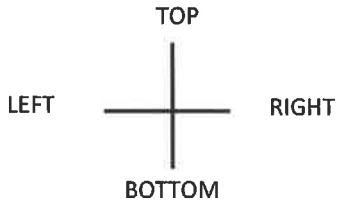
1.1.1 Pelletizer knife will be removed.

1.1.2 Pelletizer inlet outlet braided hoses will be removed from position.

1.1.3 Electrical and instrument cable connection will be removed from the pelletizer unit.

1.1.4 Pelletizer motor to gearbox and gearbox to pelletizer coupling guard removed and as found alignment will be checked and decoupled.

1.1.5 Pelletizer motor to GB & GB to pelletizer DBSE will be measured and recorded, view from palletizer motor to cutter side. Check the condition of coupling. Hard marking to be done on the coupling so we will restore it on the same location.



1.1.6 Check the condition of 'O' ring & sealing face of water box.

1.1.7 Cardan shaft as found condition will be checked.

1.1.8 Pelletizer gearbox will be removed and shifted to workshop for overhauling.

- 1.1.8.1 Pelletizer gearbox both hub removed and oil seal end plate removed & inspection done by S-Chem and oil seal removed. Hub reference will be taken.
- 1.1.8.2 In this job we will replace all bearings and seals. Inspect the gears for any damage. Take the as left measurement like backlash between the gears, contact profile, axial float of the shaft, ID of the casing & OD of the shaft at bearings location etc.
- 1.1.8.3 Hub reference on the gearbox shaft toward the motor side need to be taken.
- 1.1.8.4 Pelletizer side gearbox both hub removed and oil seal end plate removed & inspection done by S-Chem and oil seal removed.

1.1.9 Oil sampling of pelletizer oil tank will do by S-Chem.

1.1.10 Pelletizer will be shifted to outside of the extruder building for further activities. If possible, we will do the further overhauling in the S-Chem workshop.

- 1.1.10.1 After the removal of knife arrangement.
- 1.1.10.2 Initially we will take the axial float & redial clearance of the knife shaft.
- 1.1.10.3 We will replace all the bearings on the knife shaft.
- 1.1.10.4 We will replace all the seals and 'O' ring in the assembly.

1.1.11 Knife adjustment to done on the surface plate in the S-Chem workshop. Knife angle to be adjusted as per the S-chem AED or Vendor recommendation.

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1.1.12 Pelletizer docking pin and docking cylinders will be replaced with new after S-chem confirmation.
1.1.13 Cardan shaft condition will be checked, backlash will be checked. Needle bearings condition will be checked. Wipeout the old grease and new grease will be introduced.
1.1.14 Hydraulic oil filter will be replaced as per S-Chem recommendation.
1.1.15 Hydraulic oil will be drained and new oil will be filled.
1.1.16 After completing all the activities related with pelletizer unit will be transferred to the location.
1.1.17 Pelletizer engagement will be checked.
1.1.18 Final alignment will be performed between the pelletizer motor and gearbox by laser machine.
1.1.19 Final alignment will be performed between the gearbox and pelletizer by cardan laser machine.
1.1.20 In the last face alignment will be performed between the cutter and die plate.

Extruder related job: -

1.1.21 Die plate inner & outer cover & aflas seal will be removed & bolts will be loosened and removed. All the die plates steam lines or hot oil lines will be removed.
1.1.22 Die plate will be removed and shifted to S-Chem designation area.
1.1.23 Barrel cover will be removed from both sides and cleaning to be done.
1.1.24 Die plate holder steam line will be connected as per coperion vendor or S-chem specialist.
1.1.25 Startup valve connected steam line will be removed & blinding to be done.
1.1.26 Die holder will be removed from position and shift to laydown area for Hydro jetting.
1.1.27 Hydraulic cylinder will be removed and arrangement made for removal of sliding valve with jack.
1.1.28 Slider will be removed and shift to lay down area for hydro jetting.
1.1.29 Startup valve casing need to be removed from position and shift to lay down area for hydro jetting.
1.1.30 Startup valve stand will be removed & shift for hydro jetting.
    1.1.30.1 DAV plug will be removed for polymer cleaning.
    1.1.30.2 Replace the hydraulic cylinder with new.
1.1.31 Decoupling will be done between extruder screw to gearbox done.
1.1.32 The gap recorded between screw and output gear spline shaft are to be recorded.
1.1.33 N2 tubing will be removed from the visco seal.
1.1.34 Visco seal will be removed and sent for hydro jetting.
1.1.35 Check the condition of visco seal.
1.1.36 Preparation will be done for screw removal done and all related special tools will be brought at location during pre-shutdown.
1.1.37 Screw tip will be removed and pulling device will be installed.

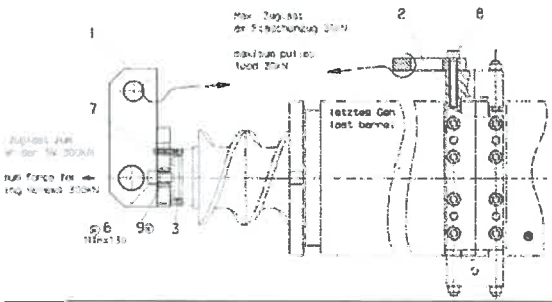

Fig: - special tool installation for screw removal

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1.1.38 Screw will be pulled out and shifted for hydro jetting.

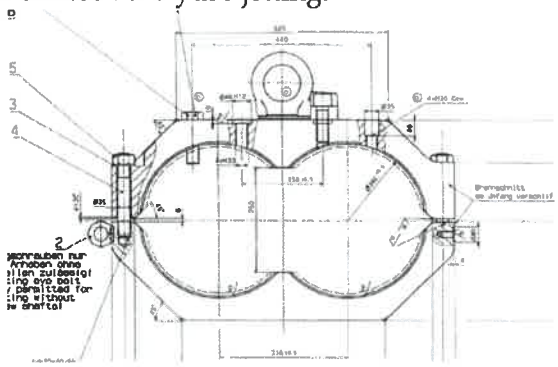

Fig: - special tool installation for holding the screws.

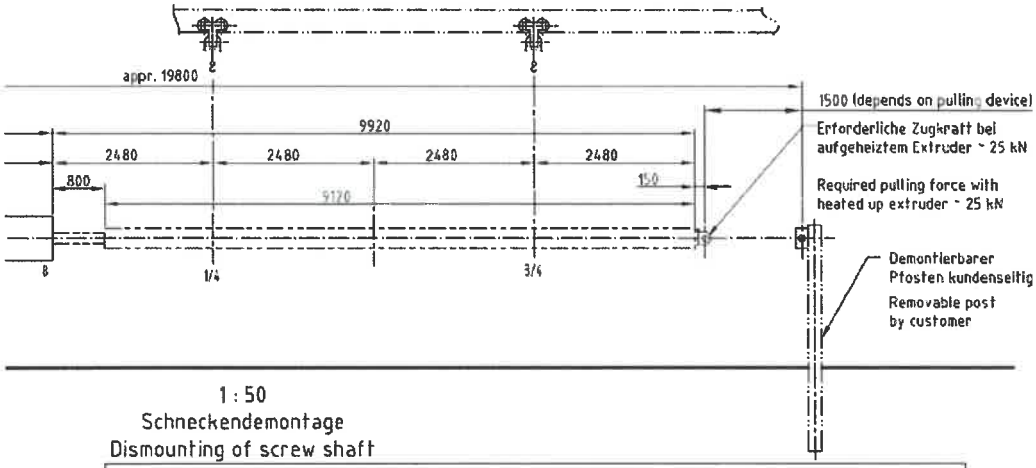

Fig: - Location of the lifting tool to be install after the removal from barrel

1.1.39 When the temperature of the barrel and screw will be recorded less than 50 degrees Celsius hydro jetting will be started.

1.1.40 4" and 6" Badger nozzle will be used for hydro jetting of barrel.

1.1.41 Untack the screw shaft elements for inspection of wear. Proper marking shall be performed as per the sequence of the screw shaft element drawings.

1.1.42 After hydro jetting of screw dent mark will be found in the left and right screw and it will be grinded as instructed by Coperion.

1.1.43 Screw diameter will be checked by coperion.

1.1.44 Left screw & right screw dimeter of each section.

1.1.45 Shaft spline inspection to be done. NDT will be performed by S-Chem team or by any other contactor.

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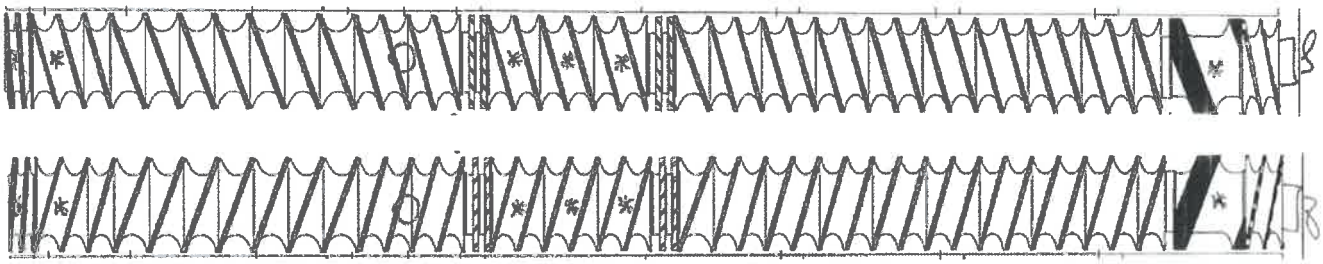
1.1.46 After finalization of the screw element to be used however new or old. We will install back it on the spline shaft.
1.1.47 If spare screw is available, we will perform the timing by roll test before the installation in the barrel.
1.1.48 Now screw already removed from the barrel so barrel cleaning can be performed
1.1.49 Hydro jetting will be done inside the barrel.
1.1.50 COBRA measurement will be performed by OEM or any other contactor to find out the wear condition inside the barrel.
1.1.51 Remove all the steam lines other accessories lines above the
1.1.52 After inspection in barrel replacement will be decided. If final decision is to replace the barrel, we will remove the barrels one by one.
1.1.53 New barrels will be installed with new gaskets as per specified torque values.
1.1.54 All the side covers will be installed.
1.1.55 Install back the screw arrangement inside the barrel as we removed.



1.1.56 Screw will be brought on trailer and lifted by the EOT and dragged inside the barrel in presence of coperion and S-Chem team.
1.1.57 Screw tip will be tightened.
1.1.58 Slider outer diameter of the startup valve will be measured and recorded.
1.1.59 Startup valve housing id measured and recorded at three positions.
1.1.60 Barrel blocks will be then installed with new seal ring and clamped and torqued @ specified values by OEM.
1.1.61 Die holder will be installed on position and bolts will be torqued @ specified values by OEM.
1.1.62 Die holder stand will be placed on position after hydro jetting.
1.1.63 Hydraulic hoses will be connected to startup valve.
1.1.64 All electrical and instrumentation done for startup valve and same will be inspected by E&I representative S-Chem.
1.1.65 All clamps will be torqued @ specified values by OEM.
1.1.66 New die plate will be installed on position with new bolts and cold torquing @ specified values by OEM.
1.1.67 All steam lines will install with to die plate with new gaskets.
1.1.68 Hot torquing for the die plate will be done @ specified values by OEM @ 175-degree temperature.
1.1.69 Visco seal will be installed at the end of the screw.

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1.1.70 Nitrogen tubing will be connected.
1.1.71 Coupling will be installed between extruder and gearbox and greasing to be done.
1.1.72 Screw to gearbox lantern cover will be installed.
1.1.73 Lantern window will be removed, cleaned & repaired, and installed on position.
1.1.74 Palletizer will be shifted back on the rails.
1.1.75 Gearbox will be installed on pelletizer.
1.1.76 Greasing will be done for the pelletizer wheels.
1.1.77 Pelletizer inlet and outlet braided hoses will be installed on position.
1.1.78 Motor electrical and instrumentation connection will be done.
1.1.79 Alignment measurement and correction will be performed between motor and gearbox of pelletizer unit.
1.1.80 Cardan shaft will be installed and torqued @ specified values by OEM. Laser Alignment will be performed between the gearbox and pelletizer and pelletizer to motor.
1.1.81 Pelletizer hydraulic piston connected with the hook and will be pin installed with circlip on both sides.
1.1.82 Pelletizer side cover removed.
1.1.83 Special tool installed for pelletizer and die plate alignment. Alignment will be performed for pelletizer and die plate
1.1.84 Special tool will be removed from the pelletizer and side cover will installed.
1.1.85 Pelletizer will be attached with die holder docking pin.
1.1.86 Machine will be handed over to S-Chem.
1.1.87 Housekeeping will be done and permit will be closed.

Main Gearbox Overhauling: -

2.1.1 Safe work permit will be obtained by operation department.
2.1.2 Gearbox to Screw coupling both side cover will be removed.
2.1.3 GB to screw Decoupling will be done.
2.1.5 GB Instrument disconnections will be done.
2.1.6 Gearbox top instruments airline blinding will be done & suction oil line will be removed.
2.1.7 Main motor to GB Desch coupling guard will be removed.
2.1.8 Ext Main Motor to GB destch coupling as found alignment will be checked & coupling will be removed.
2.1.10 GB oil sucking will be done by super sucker from the top inspection window.
2.1.11 Oil sample will be collected.
2.1.12 Oil filters will be removed after inspection it may replace with new.
2.1.13 All horizonal & Vertical side GB casing dowel pins will be removed.
2.1.14 Gearbox rear top cover bolts loosening will be done.
2.1.15 GB top casing all bolts will be removed.
2.1.16 GB rear casing will be removed.
2.1.17 After that middle casing and front casing will be removed.
2.1.18 GB Shaft#4 top shaft will be removed.
2.1.19 Two Intermediate casings will be removed.
2.1.20 All the studs will be removed.

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2.1.21 All GB shaft axial play will be checked & recorded.
2.1.22 All GB gears backlash and blue contact will be checked & recorded.
2.1.23 All GB shaft removed and shifted to workshop by trailer for bearing replacement.
2.1.27 All casing parting plate and inner housings of Top & Bottom will be cleaned.
2.1.28 New Oil filter & Gasket will be installed and box up.
2.1.29 GB parting plane threads tab cleaning will be done.
2.1.30 Shaft #4 (Top & Bottom) shafts will be dismantled, and bearings will be removed by heating.
2.1.31 Shaft #2 shaft dismantled, and tandem thrust bearings & roller bearings will be removed by heating.
2.1.32 Rotary joint will be removed from shaft #1.
2.1.33 Shaft #1 shafts will be dismantled, and bearings will be removed by heating or by cutting in the workshop.
2.1.34 Coupling Hub will be removed by Shaft#1 by hydraulic pump.
2.1.35 Shaft #5 shafts will be dismantled, and bearings will be removed by heating or by cutting in the workshop.
2.1.36 Shaft #3 shafts bearings will be removed by heating.
2.1.37 All the Gears shaft bearing positions and teeth will be cleaned and DPT will be done by S chem or any other contractor and inspection will be carried out by GAS QA/QC & S Chem AED.
2.1.38 Magnetic Particle Test will be performed by s chem or any other contractor for all the gear shafts.
2.1.39 After inspection all the bearings will be installed on the shafts by heating with bearing heater and assembled at presence of OEM.
2.1.40 Shaft #5 bearing will be installed on the position at presence of OEM
2.1.41 Shaft #4(Top & Bottom) bearing installed on the position at presence of OEM.
2.1.42 Shaft #3 bearing installed on the position at presence of OEM.
2.1.43 Shaft #2 bearing installed on the position at presence of OEM.
2.1.44 Shaft #1 bearing installed on the position at presence of OEM.
2.1.45 Coupling hub oil seal will be replaced and coupling hub installed back on shaft#1.
2.1.46 All the bearing will be installed by heating with bearing heater at temp (130°).
2.1.47 All the Shafts will be shifted to location by trailer.
2.1.48 Shaft #4 (bottom shaft) will be installed back in position.
2.1.49 Two Intermediate casings will be installed back in position by applying Loctite.
2.1.50 Shaft #3 will be installed back in position.
2.1.51 Remaining one intermediate casing will be installed back in position by applying Loctite.
2.1.52 Then Shaft #2,5&1 will be installed back in position
2.1.53 Shaft #4 (Top shaft) will be installed back in position.
2.1.54 All the shafts will be installed on position in presence of OEM.
2.1.55 All shaft as left axial play will be checked & recorded.
2.1.56 All GB gears backlash & blue contact will be checked and recorded.
2.1.55 Radial gap measurement will be checked for all shafts.
2.1.57 Rear, middle & front casing will be installed back in position by applying Loctite.
2.1.58 All dual pin will be installed; bolts will be tightened by hydra tight with required torque values.
2.1.59 Oil line and airline will be installed with new gasket.
2.1.60 O-ring & labyrinth seal will be replaced, and End cover will be installed.
2.1.61 Rotary joint installed back in Shaft#1.
2.1.62 Around 80%, oil will be filled in the gear box.
2.1.64 Splined Coupling between GB & Screw will be installed.
2.1.65 New desch clutch will be installed and motor and gear box will be coupled.
2.1.66 Motor to Gearbox Alignment will be performed.

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2.1.67 Motor to Gearbox Coupling guard will be installed.
2.1.68 All the instrument connections will be done.
2.1.71 Lube oil line will be stared & inspection will be done through inspection window in presence of OEM & Operation department of S-CHEM.
2.1.72 Inspection window will be final box up after inspection.
2.1.73 Oil level will be checked.
2.1.74 Equipment handover to S-CHEM.

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S-CHEM TA 2022
EXTRUDER OVERHAULING

ZSK 350 (Unit 44)

METHOD OF STATEMENT

PREPARED BY MAHESH RATHORE

Reviewed & Approved By:
Satyaki Mukherjee
Technical Manager (Rotating & Static)

S.Mukherjee

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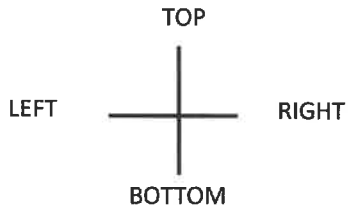
1. EQUIPMENT 42V80 EXTRUDER OVERHAULING

Pelletizer unit related job: -

1.1.0 Extruder will be decommissioned, and machine will be handed over for overhauling.
1.1.1 Pelletizer will be detached and will be retracted backward from the die plate.
1.1.2 Pelletizer knife assembly will be removed.
1.1.3 Pelletizer inlet outlet braided hoses will be removed from position.
1.1.4 Auxiliary piping's and its electrical & instrument cable connection will be removed from the pelletizer unit.
1.1.5 Pelletizer motor to GB and GB to knife shaft coupling guard will be removed and as found alignment will be checked and coupling will be removed.
1.1.6 Pelletizer motor to GB and GB to knife shaft DBSE will be measured and recorded, view from palletizer motor to cutter side. Coupling condition will be checked. Hard marking will be done on the coupling so it will be restored on the same location.



1.1.7 The condition of 'O' ring & sealing face of water box will be checked.
1.1.8 Oil sampling of pelletizer oil tank will be done by S-Chem.
1.1.9 Pelletizer will be shifted to outside of the extruder building for further activities. If possible, the further overhauling activities would be done in the S-Chem workshop.
  1.1.9.1 After the removal of knife arrangement.
  1.1.9.2 Initially the axial float & redial clearance of the knife shaft will be checked and recorded.
  1.1.9.3 We will replace all the bearings on the knife shaft.
  1.1.9.4 We will replace all the seals and 'O' ring in the assembly.
1.1.10 Knife adjustment to done on the surface plate in the S-Chem workshop. Knife angle to be adjusted as per the S-chem RELIABILITY or OEM recommendation.
1.1.11 Pelletizer docking pin and docking cylinders will be replaced with new after S-chem confirmation.
1.1.12 Cardan shaft condition will be checked, backlash will be checked. Needle bearings condition will be checked. Wipeout the old grease and new grease will be introduced.
1.1.13 Hydraulic oil filter will be replaced as per S-Chem recommendation.
1.1.14 Hydraulic oil will be drained and new oil will be filled.
1.1.15 After completing all the activities related with pelletizer unit will be transferred to the location.
1.1.16 Pelletizer engagement will be checked.
1.1.17 Final alignment will be performed between the pelletizer motor and gearbox by laser machine.
1.1.18 Final alignment will be performed between the gearbox and pelletizer by cardan laser machine.
1.1.19 In the last face alignment will be performed between the cutter and die plate.

Extruder related job: -

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1.1.20 Die plate inner & outer cover & aflas seal will be removed & bolts will be loosened and removed. All the die plates steam lines or hot oil lines will be removed.
1.1.21 Die plate will be removed and shifted to S-Chem designation area.
1.1.22 Barrel cover will be removed from both sides and cleaning to be done.
1.1.23 Die plate holder steam line will be connected as per coperion vendor or S-chem specialist.

1.1.24 Startup valve connecting steam line will be removed & blinding to be done.
1.1.25 Die holder bolts will be loosened and removed from position and shift to laydown area for Hydro jetting.
1.1.26 Hydraulic cylinder will be removed and arrangement made for removal of sliding valve with jack.
1.1.27 Slider will be removed and shift to lay down area for hydro jetting.
1.1.28 Startup valve casing will be removed from position and shift to lay down area for hydro jetting.
1.1.29 Startup valve stand will be removed & shift for hydro jetting.
    1.1.29.1 DAV plug will be removed for polymer cleaning.
    1.1.29.2 Replace the hydraulic cylinder with new.
1.1.30 Decoupling will be done between extruder screw to gearbox done.
1.1.31 The gap recorded between screw and output gear spline shaft are to be recorded.
1.1.32 N2 tubing will be removed from the visco seal.
1.1.33 Visco seal will be removed and sent for hydro jetting.
1.1.34 Check the condition of visco seal.
1.1.35 Preparation will be done for screw removal done and all related special tools will be brought at location during pre-shutdown.
1.1.36 Screw tip will be removed and pulling device will be installed.

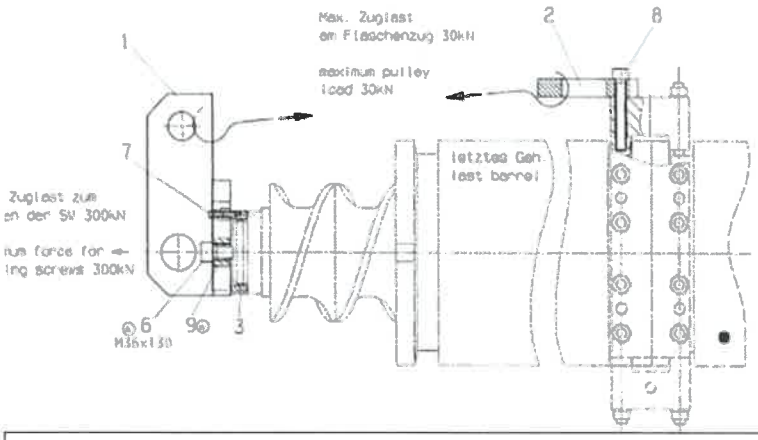

Fig: - special tool installation for screw removal

1.1.37 Screw will be pulled out and shifted to designated area for hydro jetting.

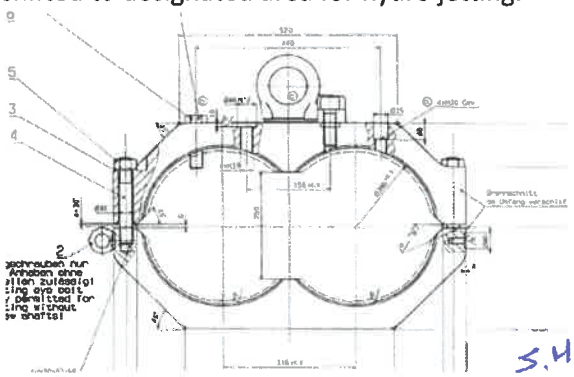

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Fig: - special tool installation for holding the screws.

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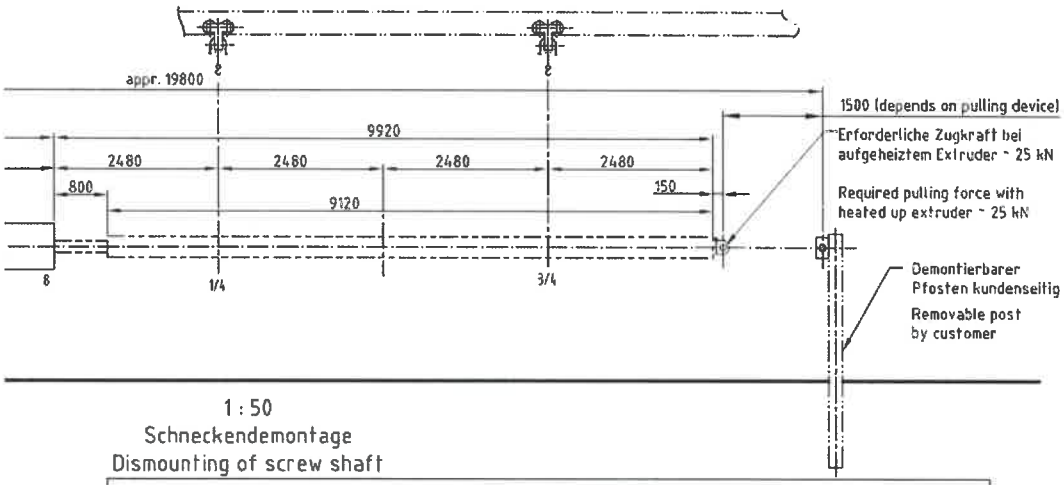


Fig: - Location of the lifting tool to be install after the removal from barrel

1.1.38 When the temperature of the barrel and screw will be recorded less than 50 degrees Celsius hydro jetting will be started.

1.1.39 4" and 6" Badger nozzle will be used for hydro jetting of barrel.

1.1.40 Untack the screw shaft elements for inspection of wear. Proper marking shall be performed as per the sequence of the screw shaft element drawings.

1.1.41 After hydro jetting of screw dent mark will be found in the left and right screw and it will be grinded as instructed by Coperion.

1.1.42 Screw diameter will be checked by coperion.

1.1.43 Left screw & right screw dimeter of each section.

1.1.44 Shaft spline inspection to be done. NDT will be performed by S-Chem team or by any other contactor.

1.1.45 After finalization of the screw element to be used however new or old. We will install back it on the spline shaft.

1.1.46 If spare screw is available, we will perform the timing by roll test before the installation in the barrel.

1.1.47 Now screw already removed from the barrel so barrel cleaning can be performed

1.1.48 Hydro jetting will be done inside the barrel.

1.1.49 COBRA measurement will be performed by OEM or any other contactor to find out the wear condition inside the barrel.

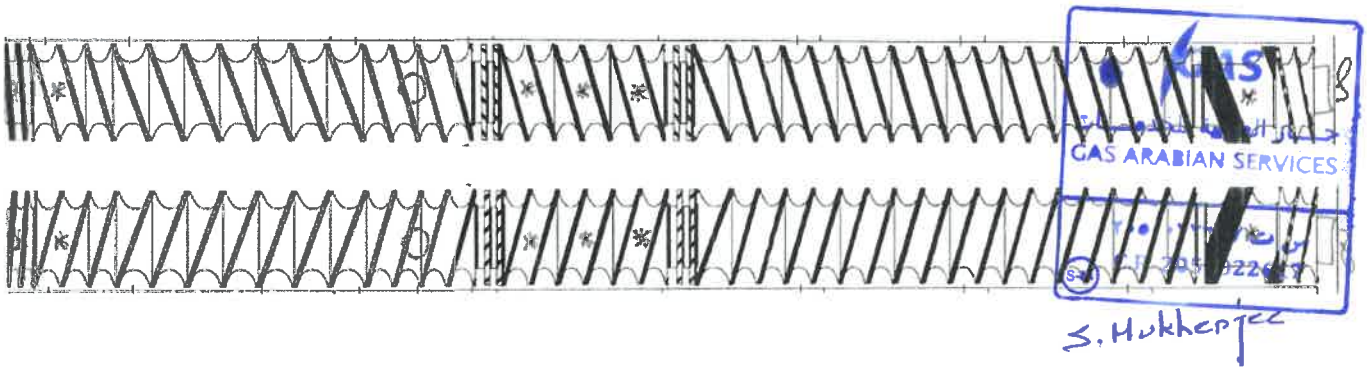
1.1.50 Remove all the steam lines other accessories lines above the

1.1.51 After inspection in barrel replacement will be decided. If final decision is to replace the barrel, we will remove the barrels one by one.

1.1.52 New barrels will be installed with new gaskets as per specified torque values.

1.1.53 All the side covers will be installed.

1.1.54 Install back the screw arrangement inside the barrel as we removed.



1.1.55 Screw will be brought on trailer and lifted by the EOT and dragged inside the barrel in presence of coperion and S-Chem team.
1.1.56 Screw tip will be tightened.
1.1.57 Slider outer diameter of the startup valve were measured and recorded.
1.1.58 Startup valve housing id measured and recorded at three positions.
1.1.59 Barrel blocks will be then installed with new seal ring and clamped and torqued @ specified values by OEM.
1.1.60 Die holder will be installed on position and bolts were torqued @ specified values by OEM.
1.1.61 Die holder stand will be placed on position after hydro jetting.
1.1.62 Hydraulic hoses will be connected to startup valve.
1.1.63 All electrical and instrumentation done for startup valve and same will be inspected by E&I representative S-Chem.
1.1.64 All clamps will be torqued @ specified values by OEM.
1.1.65 New die plate will be installed on position with new bolts and cold torquing @ specified values by OEM.
1.1.66 All steam lines will install with to die plate with new gaskets.
1.1.67 Hot torquing for the die plate will be done @ specified values by OEM @ 175-degree temperature.
1.1.68 Visco seal will be installed at the end of the screw.
1.1.69 Nitrogen tubing will be connected.
1.1.70 Coupling will be installed between extruder and gearbox and greasing to be done.
1.1.71 Screw to gearbox lantern cover will be installed.
1.1.72 Lantern window will be removed, cleaned & repaired, and installed on position.
1.1.73 Palletizer will be shifted back on the rails.
1.1.74 Gearbox will be installed on pelletizer.
1.1.75 Greasing will be done for the pelletizer wheels.
1.1.76 Pelletizer inlet and outlet braided hoses will be installed on position.
1.1.77 Motor electrical and instrumentation connection will be done.
1.1.78 As left Alignment will be checked and correction will be performed between motor and gearbox of pelletizer unit.
1.1.79 Cardan shaft will be installed and torqued @ specified values by OEM. Laser Alignment will be performed between the gearbox and knife shaft.
1.1.80 Pelletizer hydraulic piston connected with the hook and will be pin installed with circlip on both sides.
1.1.81 Pelletizer side cover removed.
1.1.82 Special tool installed for pelletizer and die plate alignment. Alignment will be performed for pelletizer and die plate
1.1.83 Special tool will be removed from the pelletizer and side cover will installed.
1.1.84 Pelletizer will be attached with die holder docking pin.
1.1.85 Machine will be handed over to S-Chem.
1.1.86 Housekeeping will be done and permit will be closed.

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Main Gearbox Overhauling: -

2.1.1 Safe work permit will be obtained by operation department.
2.1.2 Gearbox to Screw coupling both side cover will be removed.
2.1.3 GB to screw Decoupling will be done.
2.1.5 GB Instrument disconnections will be done.
2.1.6 Gearbox top instruments airline blinding will be done & suction oil line will be removed.
2.1.7 Main motor to GB Desch coupling guard will be removed.
2.1.8 Ext Main Motor to GB destch coupling as found alignment will be checked & coupling will be removed.
2.1.10 GB oil sucking will be done by super sucker from the top inspection window.
2.1.11 Oil sample will be collected.
2.1.12 Oil filters will be removed after inspection it may replace with new.
2.1.13 All horizonal & Vertical side GB casing dowel pins will be removed.
2.1.14 Gearbox rear top cover bolts loosening will be done.
2.1.15 GB top casing all bolts will be removed.
2.1.16 GB rear casing will be removed.
2.1.17 After that middle casing and front casing will be removed.
2.1.18 GB Shaft#4 top shaft will be removed.
2.1.19 Two Intermediate casings will be removed.
2.1.20 All the studs will be removed.
2.1.21 All GB shaft axial play will be checked & recorded.
2.1.22 All GB gears backlash and blue contact will be checked & recorded.
2.1.23 All GB shaft removed and shifted to workshop by trailer for bearing replacement.
2.1.27 All casing parting plate and inner housings of Top & Bottom will be cleaned.
2.1.28 New Oil filter & Gasket will be installed and box up.
2.1.29 GB parting plane threads tab cleaning will be done.
2.1.30 Shaft #4 (Top & Bottom) shafts will be dismantled, and bearings will be removed by heating.
2.1.31 Shaft #2 shaft dismantled, and tandem thrust bearings & roller bearings will be removed by heating.
2.1.32 Rotary joint will be removed from shaft #1.
2.1.33 Shaft #1 shafts will be dismantled, and bearings will be removed by heating or by cutting in the workshop.
2.1.34 Coupling Hub will be removed by Shaft#1 by hydraulic pump.
2.1.35 Shaft #5 shafts will be dismantled, and bearings will be removed by heating or by cutting in the workshop.
2.1.36 Shaft #3 shafts bearings will be removed by heating.
2.1.37 All the Gears shaft bearing positions and teeth will be cleaned and DPT will be done by S chem or any other contractor and inspection will be carried out by GAS QA/QC & S Chem AED.
2.1.38 Magnetic Particle Test will be performed by s chem or any other contractor for all the gear shafts.
2.1.39 After inspection all the bearings will be installed on the shafts by heating with bearing heater and assembled at presence of OEM.
2.1.40 Shaft #5 bearing will be installed on the position at presence of OEM
2.1.41 Shaft #4(Top & Bottom) bearing installed on the position at presence of OEM.
2.1.42 Shaft #3 bearing installed on the position at presence of OEM.

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2.1.43 Shaft #2 bearing installed on the position at presence of OEM.
2.1.44 Shaft #1 bearing installed on the position at presence of OEM.
2.1.45 Coupling hub oil seal will be replaced and coupling hub installed back on shaft#1.
2.1.46 All the bearing will be installed by heating with bearing heater at temp (130°).
2.1.47 All the Shafts will be shifted to location by trailer.
2.1.48 Shaft #4 (bottom shaft) will be installed back in position.
2.1.49 Two Intermediate casings will be installed back in position by applying Loctite.
2.1.50 Shaft #3 will be installed back in position.
2.1.51 Remaining one intermediate casing will be installed back in position by applying Loctite.
2.1.52 Then Shaft #2,5&1 will be installed back in position
2.1.53 Shaft #4 (Top shaft) will be installed back in position.
2.1.54 All the shafts will be installed on position in presence of OEM.
2.1.55 All shaft as left axial play will be checked & recorded.
2.1.56 All GB gears backlash & blue contact will be checked and recorded.
2.1.55 Radial gap measurement will be checked for all shafts.
2.1.57 Rear, middle & front casing will be installed back in position by applying Loctite.
2.1.58 All dual pin will be installed; bolts will be tightened by hydra tight with required torque values.
2.1.59 Oil line and airline will be installed with new gasket.
2.1.60 O-ring & labyrinth seal will be replaced, and End cover will be installed.
2.1.61 Rotary joint installed back in Shaft#1.
2.1.62 Around 80%, oil will be filled in the gear box.
2.1.64 Splined Coupling between GB & Screw will be installed.
2.1.65 New desch clutch will be installed and motor and gear box will be coupled.
2.1.66 Motor to Gearbox Alignment will be performed.
2.1.67 Motor to Gearbox Coupling guard will be installed.
2.1.68 All the instrument connections will be done.
2.1.71 Lube oil line will be stared & inspection will be done through inspection window in presence of OEM & Operation department of S-CHEM.
2.1.72 Inspection window will be final box up after inspection.
2.1.73 Oil level will be checked.
2.1.74 Equipment handover to S-CHEM.

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Primavera Project Schedule

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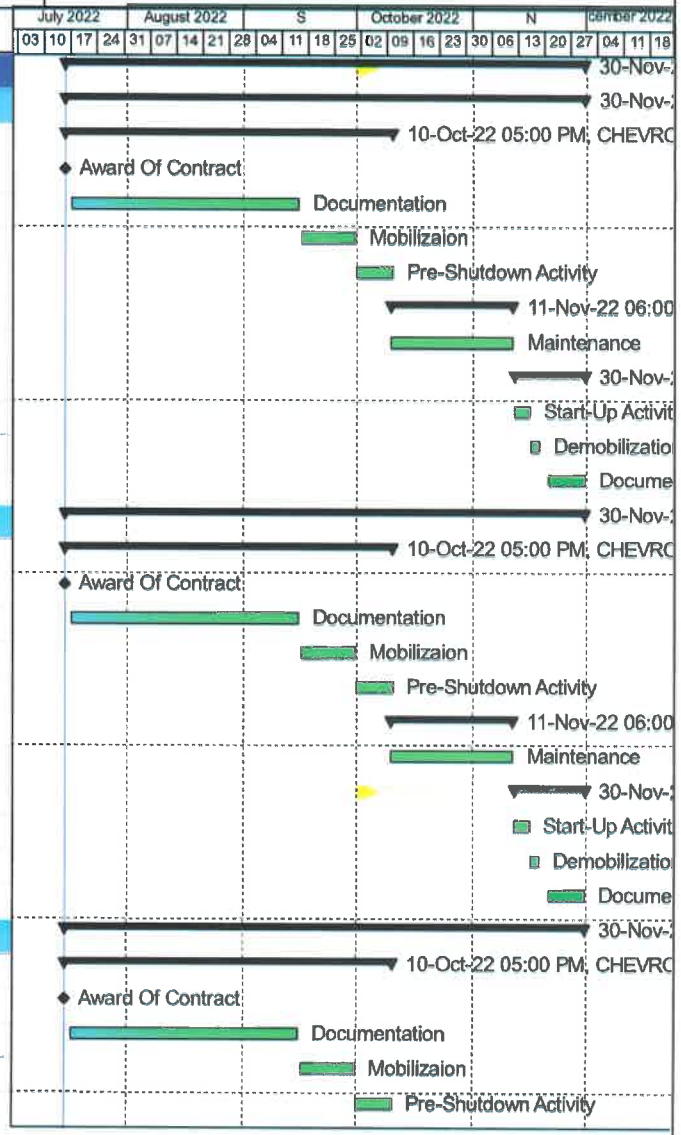
Chvron Turnaround 2022(Unit 42,43,44) | Classic WBS Layout | 31-Oct-21 10:58 AM

Activity ID	Activity Name	Original Duration	Start	Finish
CHEVRON	Chvron Turnaround 2022(Unit 42,43,44)	792.0h	15-Jul-22 08:00 AM	30-Nov-22 05:00 PM
CHEVRON.2	Extruder's System Related- Rotating Scope - Unit 42	792.0h	15-Jul-22 08:00 AM	30-Nov-22 05:00 PM
CHEVRON.2.1	Milestones	496.0h	15-Jul-22 08:00 AM	10-Oct-22 05:00 PM
A1160	Award Of Contract	0.0h	15-Jul-22 08:00 AM	
A1170	Documentation	360.0h	17-Jul-22 08:00 AM	15-Sep-22 05:00 PM
A1180	Mobilizaion	317.0h	16-Sep-22 07:00 AI	30-Sep-22 05:00 PM
A1190	Pre-Shutdown Activity	213.0h	01-Oct-22 01:00 AM	10-Oct-22 05:00 PM
CHEVRON.2.2	Execution	720.0h	10-Oct-22 01:00 AM	11-Nov-22 06:00 PM
A1200	Maintenance	720.0h	10-Oct-22 01:00 AM	11-Nov-22 06:00 PM
CHEVRON.2.3	Comissioning	104.0h	12-Nov-22 01:00 AI	30-Nov-22 05:00 PM
A1210	Start-Up Activities	88.0h	12-Nov-22 01:00 AI	16-Nov-22 12:00 AM
A1220	Demobilization	55.0h	16-Nov-22 06:00 AI	18-Nov-22 06:00 PM
A1230	Documentation	64.0h	21-Nov-22 08:00 AI	30-Nov-22 05:00 PM
CHEVRON.4	Extruder's System Related- Rotating Scope - Unit 43	792.0h	15-Jul-22 08:00 AM	30-Nov-22 05:00 PM
CHEVRON.4.1	Milestones	496.0h	15-Jul-22 08:00 AM	10-Oct-22 05:00 PM
A1000	Award Of Contract	0.0h	15-Jul-22 08:00 AM	
A1010	Documentation	360.0h	17-Jul-22 08:00 AM	15-Sep-22 05:00 PM
A1020	Mobilizaion	317.0h	16-Sep-22 07:00 AI	30-Sep-22 05:00 PM
A1030	Pre-Shutdown Activity	213.0h	01-Oct-22 01:00 AM	10-Oct-22 05:00 PM
CHEVRON.4.2	Execution	720.0h	10-Oct-22 01:00 AM	11-Nov-22 06:00 PM
A1040	Maintenance	720.0h	10-Oct-22 01:00 AM	11-Nov-22 06:00 PM
CHEVRON.4.3	Comissioning	104.0h	12-Nov-22 01:00 AI	30-Nov-22 05:00 PM
A1050	Start-Up Activities	88.0h	12-Nov-22 01:00 AI	16-Nov-22 12:00 AM
A1060	Demobilization	55.0h	16-Nov-22 06:00 AI	18-Nov-22 06:00 PM
A1070	Documentation	64.0h	21-Nov-22 08:00 AI	30-Nov-22 05:00 PM
CHEVRON.1	Extruder's System Related- Rotating Scope - Unit 44	792.0h	15-Jul-22 08:00 AM	30-Nov-22 05:00 PM
CHEVRON.1.1	Milestones	496.0h	15-Jul-22 08:00 AM	10-Oct-22 05:00 PM
A1080	Award Of Contract	0.0h	15-Jul-22 08:00 AM	
A1090	Documentation	360.0h	17-Jul-22 08:00 AM	15-Sep-22 05:00 PM
A1100	Mobilizaion	317.0h	16-Sep-22 07:00 AI	30-Sep-22 05:00 PM
A1110	Pre-Shutdown Activity	213.0h	01-Oct-22 01:00 AM	10-Oct-22 05:00 PM



TASK filter: All Activities

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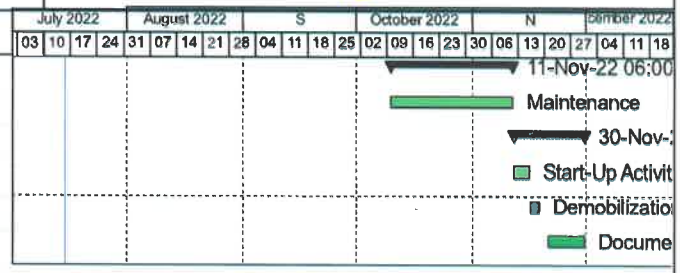
Activity ID	Activity Name	Original Duration	Start	Finish
CHEVRON.1.2 Execution		720.0h	10-Oct-22 01:00 AM	11-Nov-22 06:00 PM
A1120	Maintenance	720.0h	10-Oct-22 01:00 AM	11-Nov-22 06:00 PM
CHEVRON.1.3 Comissioning		104.0h	12-Nov-22 01:00 AM	30-Nov-22 05:00 PM
A1130	Start-Up Activities	88.0h	12-Nov-22 01:00 AM	16-Nov-22 12:00 AM
A1140	Demobilization	55.0h	16-Nov-22 06:00 AM	18-Nov-22 06:00 PM
A1150	Documentation	64.0h	21-Nov-22 08:00 AM	30-Nov-22 05:00 PM



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Direct Manpower Deployment Plan

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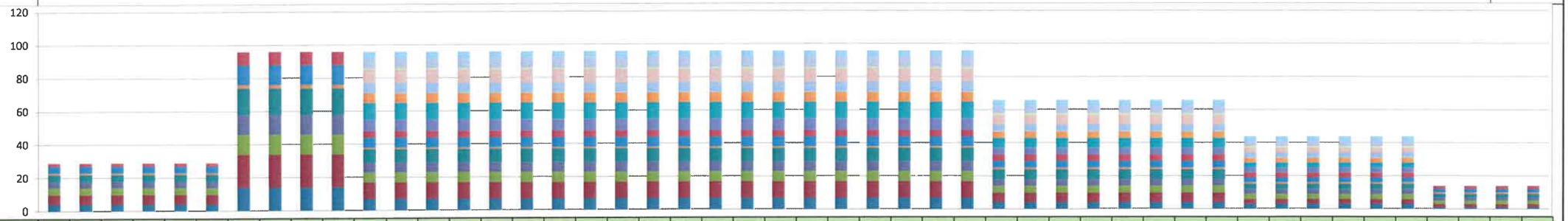
INSPECTION AND OVERHAUL ON EXTRUDER MACHINES (SPCO TA 2022)-CHEVRON

DIRECT MANPOWER DEPLOYMENT & HISTOGRAM



Manpower Descrition	21-Sep-22	22-Sep-22	23-Sep-22	24-Sep-22	25-Sep-22	26-Sep-22	27-Sep-22	28-Sep-22	29-Sep-22	30-Sep-22	01-Oct-22	02-Oct-22	03-Oct-22	04-Oct-22	05-Oct-22	06-Oct-22	07-Oct-22	08-Oct-22	09-Oct-22	10-Oct-22	11-Oct-22	12-Oct-22	13-Oct-22	14-Oct-22	15-Oct-22	16-Oct-22	17-Oct-22	18-Oct-22	19-Oct-22	20-Oct-22	21-Oct-22	22-Oct-22	23-Oct-22	24-Oct-22	25-Oct-22	26-Oct-22	27-Oct-22	28-Oct-22	29-Oct-22	30-Oct-22	31-Oct-22	01-Nov-22	02-Nov-22	03-Nov-22	04-Nov-22	05-Nov-22	06-Nov-22	07-Nov-22
	PRE-SD										SHUTDOWN																																					
DAY SHIFT																																																
SR. MILLWRIGHT	4	4	4	4	4	4	14	14	14	14	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4	4	4	4	4	4	4	4	3	3	3	3	3	3	1	1	1	1
MILLRIGHT	6	6	6	6	6	6	20	20	20	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	6	6	6	6	6	6	6	6	3	3	3	3	3	3	2	2	2	2
PIPE FITTER	4	4	4	4	4	4	12	12	12	12	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	4	4	4	4	4	4	4	3	3	3	3	3	3	2	2	2	2
RIGGER LEVEL-2	4	4	4	4	4	4	12	12	12	12	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	4	4	4	4	4	4	4	3	3	3	3	3	3	2	2	2	2
HELPER	4	4	4	4	4	4	16	16	16	16	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	6	6	6	6	6	6	6	3	3	3	3	3	3	2	2	2	2
RIGGER LEVEL-1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
E&I TECHNICIANS	4	4	4	4	4	4	12	12	12	12	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	4	4	4	4	4	4	4	3	3	3	3	3	3	2	2	2	2
FW / SB / FM	2	2	2	2	2	2	8	8	8	8	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	2	2	2	2
NIGHT SHIFT																																																
SR. MILLWRIGHT											7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4	4	4	4	4	4	4	4	3	3	3	3	3	3				
MILLRIGHT											10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	6	6	6	6	6	6	6	6	3	3	3	3	3	3				
PIPE FITTER											6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	4	4	4	4	4	4	4	3	3	3	3	3	3				
RIGGER LEVEL-2											6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	4	4	4	4	4	4	4	3	3	3	3	3	3				
HELPER											8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	6	6	6	6	6	6	6	3	3	3	3	3	3				
RIGGER LEVEL-1											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
E&I TECHNICIANS											6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	4	4	4	4	4	4	4	3	3	3	3	3	3				
FW / SB / FM											4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3				
TOTAL	**29**	**29**	**29**	**29**	**29**	**29**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**96**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**44**	**44**	**44**	**44**	**44**	**44**	**14**	**14**	**14**	**14**

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Indirect Manpower Deployment Plan

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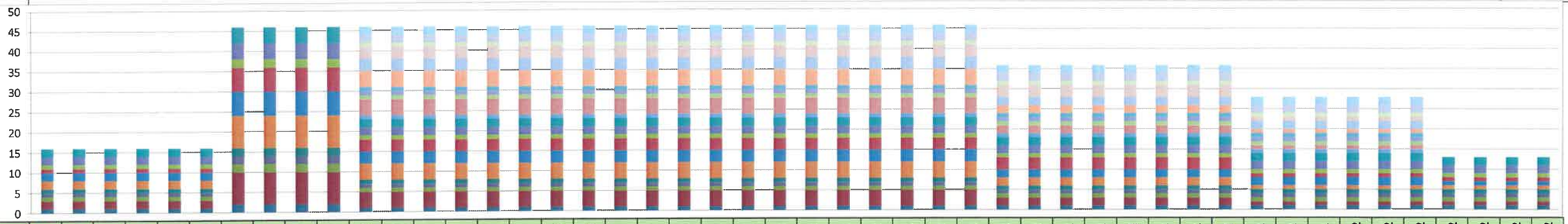
INSPECTION AND OVERHAUL ON EXTRUDER MACHINES (SPCO TA 2022)-CHEVRON

INDIRECT MANPOWER DEPLOYMENT & HISTOGRAM



Manpower Descrition	21-Sep-22	22-Sep-22	23-Sep-22	24-Sep-22	25-Sep-22	26-Sep-22	27-Sep-22	28-Sep-22	29-Sep-22	30-Sep-22	01-Oct-22	02-Oct-22	03-Oct-22	04-Oct-22	05-Oct-22	06-Oct-22	07-Oct-22	08-Oct-22	09-Oct-22	10-Oct-22	11-Oct-22	12-Oct-22	13-Oct-22	14-Oct-22	15-Oct-22	16-Oct-22	17-Oct-22	18-Oct-22	19-Oct-22	20-Oct-22	21-Oct-22	22-Oct-22	23-Oct-22	24-Oct-22	25-Oct-22	26-Oct-22	27-Oct-22	28-Oct-22	29-Oct-22	30-Oct-22	31-Oct-22	01-Nov-22	02-Nov-22	03-Nov-22	04-Nov-22	05-Nov-22	06-Nov-22	07-Nov-22
	PRE-SD										SHUTDOWN																															POST-SD						
DAY SHIFT																																																
SITE INCHARGE	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ROTATING ENGINEER	2	2	2	2	2	2	8	8	8	8	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1
PLANNING ENGINEER	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
QC ENGINEER	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
E&I ENGINEER	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ROTATING SUPERVISOR	2	2	2	2	2	2	8	8	8	8	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1
SAFETY OFFICER	2	2	2	2	2	2	6	6	6	6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1
PERMIT RECEIVER	1	1	1	1	1	1	6	6	6	6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1
MATERIAL COORDINATOR	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
STORE KEEPER	2	2	2	2	2	2	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
OFFICE BOY	2	2	2	2	2	2	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NIGHT SHIFT																																																	
SITE INCHARGE											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
ROTATING ENGINEER											4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	1	1	1	1	1	1					
PLANNING ENGINEER											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
QC ENGINEER											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
E&I ENGINEER											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
ROTATING SUPERVISOR											4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	1	1	1	1	1	1					
SAFETY OFFICER											3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
PERMIT RECEIVER											3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1					
MATERIAL COORDINATOR											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
STORE KEEPER											2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
OFFICE BOY											2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
TOTAL	16	16	16	16	16	16	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	36	36	36	36	36	36	36	36	28	28	28	28	28	28	13	13	13	13	13

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Overall Manpower Histogram

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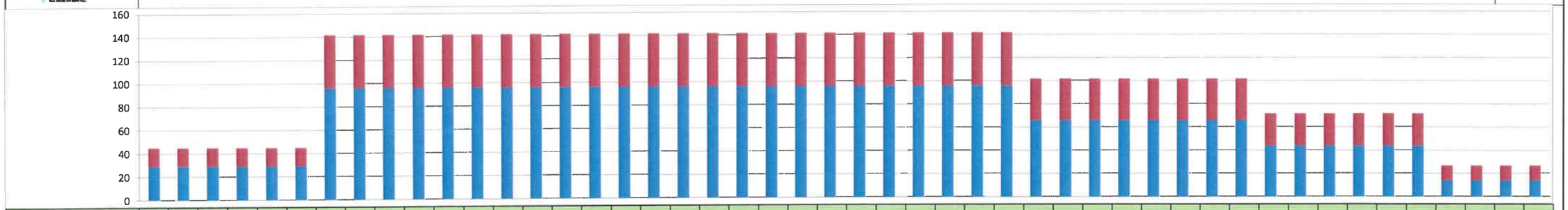
INSPECTION AND OVERHAUL ON EXTRUDER MACHINES (SPCO TA 2022)-CHEVRON

OVERALL MANPOWER HISTOGRAM



Manpower Descrition	21-Sep-22	22-Sep-22	23-Sep-22	24-Sep-22	25-Sep-22	26-Sep-22	27-Sep-22	28-Sep-22	29-Sep-22	30-Sep-22	01-Oct-22	02-Oct-22	03-Oct-22	04-Oct-22	05-Oct-22	06-Oct-22	07-Oct-22	08-Oct-22	09-Oct-22	10-Oct-22	11-Oct-22	12-Oct-22	13-Oct-22	14-Oct-22	15-Oct-22	16-Oct-22	17-Oct-22	18-Oct-22	19-Oct-22	20-Oct-22	21-Oct-22	22-Oct-22	23-Oct-22	24-Oct-22	25-Oct-22	26-Oct-22	27-Oct-22	28-Oct-22	29-Oct-22	30-Oct-22	31-Oct-22	01-Nov-22	02-Nov-22	03-Nov-22	04-Nov-22	05-Nov-22	06-Nov-22	07-Nov-22
	PRE-SD										SHUTDOWN																																					
DIRECT	29	29	29	29	29	29	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	66	66	66	66	66	66	66	66	44	44	44	44	44	44	14	14	14	14
INDIRECT	16	16	16	16	16	16	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	36	36	36	36	36	36	36	36	28	28	28	28	28	28	13	13	13	13
TOTAL	**45**	**45**	**45**	**45**	**45**	**45**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**142**	**102**	**102**	**102**	**102**	**102**	**102**	**102**	**102**	**72**	**72**	**72**	**72**	**72**	**72**	**27**	**27**	**27**	**27**

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Equipment Deployment Plan

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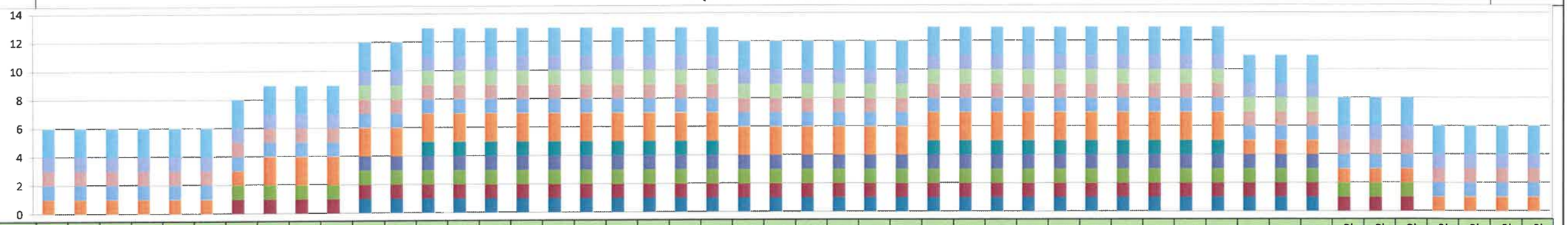
INSPECTION AND OVERHAUL ON EXTRUDER MACHINES (SPCO TA 2022)-CHEVRON

EQUIPMENT HISTOGRAM



Manpower Descrition	21-Sep-22	22-Sep-22	23-Sep-22	24-Sep-22	25-Sep-22	26-Sep-22	27-Sep-22	28-Sep-22	29-Sep-22	30-Sep-22	01-Oct-22	02-Oct-22	03-Oct-22	04-Oct-22	05-Oct-22	06-Oct-22	07-Oct-22	08-Oct-22	09-Oct-22	10-Oct-22	11-Oct-22	12-Oct-22	13-Oct-22	14-Oct-22	15-Oct-22	16-Oct-22	17-Oct-22	18-Oct-22	19-Oct-22	20-Oct-22	21-Oct-22	22-Oct-22	23-Oct-22	24-Oct-22	25-Oct-22	26-Oct-22	27-Oct-22	28-Oct-22	29-Oct-22	30-Oct-22	31-Oct-22	01-Nov-22	02-Nov-22	03-Nov-22	04-Nov-22	05-Nov-22	06-Nov-22	07-Nov-22
	PRE-SD										SHUTDOWN																																						
EQUIPMENT																																																	
CRANE 50 TON											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
FORK LIFT 5 TON							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
DYNA							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
TRAILER											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
TORQUING													1	1	1	1	1	1	1	1	1								1	1	1	1	1	1	1	1	1	1									
MESS HALL (40 FT)	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
PROTA CABIN (40 FT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ABULUTION UNIT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
AIR COMPRESSOR - 375 CFM											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
DIESEL GENERATOER - 100 KVA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TOOL CONTAINER	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TOTAL	6	6	6	6	6	6	8	9	9	9	12	12	13	13	13	13	13	13	13	13	13	13	12	12	12	12	12	12	13	13	13	13	13	13	13	13	13	13	11	11	11	8	8	8	6	6	6	6

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Relevant Work Experience (with Client Contacts)

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ROTATING EQUIPMENT OVERHAULING CREDENTIAL (GAS ARABIAN SERVICES)

#	Contract (P.O) Number	Contract Scope	Customer Company Name	Execution site location	Workshop details, owned or hired under your contract within Eastern Province, Kingdom of Saudi Arabia, if used to excute the overhauling.	Value in US$	No of machines overhauled	Total M-H	Worked as a Main Contractor or as a Sub-Contractor	Contract Duration (Days)	Completion Date/ Year (Descending order)
1	4300415097	EExtruder# 4 Mixer Gear Reducer, Diverter, Gear Pump and GP Gear Reducer for POLY II - Extruder Mixer Gear Reducer oil leak repair (Seals replacement). - Extruder Mixer Diverter overhauling and adjustment of alignment. - Gear Pump & GP Gearbox Reducer adjustment of alignment	SABIC-YANPET	1300 Yanpet, Postal Code 21441 Yanbu, Western Province, Kingdom of Saudi Arabia	In-situ	303,382.16	1	4320	Main	12	9-Apr-21
2	4300415097	MM21 Extruders overhauling line 6&7.	SABIC-YANPET	1300 Yanpet, Postal Code 21441 Yanbu, Western Province, Kingdom of Saudi Arabia	In-situ		2	7920	Main	22	21-Jun-21
3	4300415096	MM21 Extrodur# 5 for Mixer Gate & Diverter O/H, Gear Pump & GP Gear Reducer alignment adjustment for POLY II	SABIC-YANPET	1300 Yanpet, Postal Code 21441 Yanbu, Western Province, Kingdom of Saudi Arabia	In-situ	280,045.01	1	5880	Main	14	1-Jul-21
4		Line 2 gear pump and gear box overhauling					1	10800		18	
5	4500096035	Overhauling of FGC Compressor/Turbine & Auxiliaries. Overhauling of VGC Compressor/Turbine & Auxiliaries and Nitrogen. Overhauling of RGC Compressor/Turbine & Auxiliaries Additional job at VGC Compressor to be carried out as per technical team recommendation. as mentioned below, Gearbox inspection including lifting of top cover, bearings & Gear teeth inspection. Parts needs to be checked are bearings & gears. (Add. job): VGC Gearbox inspection. FGC complete oil replacement (Add. job): FGC complete oil replacement. N2 Compressor inspection & Testing	SIPCHEM	PO Box 12021, Jubail Industrial City 31961, Eastern Province, Kingdom of Saudi Arabia	In-situ	126,359.52	7	6912	Main	18	4-Jan-21
6	4700004418	Rotating Equipments during execution of LDPE TAM 2020	TASNEE	P.O Box 35579, Al-Jubail 31961, Eastern Province, Kingdom of Saudi Arabia	In-situ	246,378.16	3	24840	Main	23	20-Jun-21
7	4700004418 /REV-2	LDTAM21 RCON scope Gear box OH 6G-1704	TASNEE	P.O Box 35579, Al-Jubail 31961, Eastern Province, Kingdom of Saudi Arabia	In-situ	104,247.67	1	3420	Main	19	17-Jun-21
8	4700004874	ECTAM2021 MHI-C3R Compressor Alignment	TASNEE	P.O Box 35579, Al-Jubail 31961, Eastern Province, Kingdom of Saudi Arabia	In-situ	23,968.04	1	288	Main	3	14-Jun-21
9	4700004872	ECTAM2021 MHI-C2R Compressor Alignment	TASNEE	P.O Box 35579, Al-Jubail 31961, Eastern Province, Kingdom of Saudi Arabia	In-situ	23,968.04	1	288	Main	3	14-Jun-21
10	4500022413	Minor Rotating Equipment LSTK -Agitator, rotary feeder, pump, motor, gala dryer, extruder, oil handling, purge vessel agitator, schrenk feeder, motor related overhauling & replacement activities.	ADVANCED	P.O. Box 11022, Jubail 31961 Jubail Industrial City, Eastern Province, Kingdom of Saudi Arabia	In-situ	789,781.09	108	46200	Main	35	9-Apr-21
11	4300322393	Maintenance of rotating equipment jobs such as extruder, compressors, rotary feeders, pumps, blowers, hydraulic systems & misc., including pm & corrective maintenance along with clearance check, axial & radial float check, back lash check, DP test, alignment checking & correction, bearings & seals replacement, oils replacement, filter replacement, hoses replacement, overspeed test in turbine, associated motors removal, re-installation & alignment, dis-connect & connect the electrical connections, removal & installation of instrumentation elements and other miscellaneous repair & supports	SABIC-IBN ZAHR	3300 IBN ZAHR, PO Box 10330, 31961 Al-Jubail, Eastern Province, Kingdom of Saudi Arabia	In-situ	130,348.20	10	19440	Main	27	12-Jan-20
12	4300311454	To do machinery overhauling service during PE 3&4 major shutdown February 2020 as per below scope of work: -4K2401 centrifugal compressor partial overhauling -3K2401 & 4K2401 inlet guide vane overhauling -3KT2401 steam turbine complete overhauling -4KT2401 steam turbine partial overhauling -3K2551 screw compressor complete overhauling -4G2622Z gear box of gear pump overhauling -3K2401P1/P2/P3 & 4K2401P1/P2/P3 screw pumps replacement	SABIC-SHARQ	PO Box 10035, 31961 Al-Jubail, Eastern Province, Kingdom of Saudi Arabia	In-situ	375,778.64	13	15840	Main	22	2-Mar-20
13	4300330359	1. Foam Cleaning for External fins 2. Tubes internal cleaning 3. Tubes plug opening for inspection 4. Tube side Hydrotest 5. Seal weld for tubes plugs if required 6. Bearing inspection & replacement if needed 7. Belt alignment & tensioning to be checked & replacement if needed 8. Pulley alignment & replacement if damaged 9. Cover motor & bearing unit Total Nos. of unit- 20 Nos.	SABIC-SHARQ	PO Box 10035, 31961 Al-Jubail, Eastern Province, Kingdom of Saudi Arabia	In-situ	445,686.55	20	21120	Main	22	28-Feb-20
14	4503851015	Extrodur Mixer and Gear Box O/H for POLY II. - Extruder Gear pump gearbox bearings replacement (Overhauling) - Extruder Gear pump bearings replacement (Overhauling) - Complete overhaul of mixer rotor assembly including timing gear reducer, Seal housing, and gear and bearing - Main drive gearbox overhaul	SABIC-YANPET	1300 Yanpet, Postal Code 21441 Yanbu, Western Province, Kingdom of Saudi Arabia	In-situ	136,218.48	1	8640	Main	18	24-Mar-20
15	4600008936	Service Contractor for Maintenance job of HYPER compressor (6k-1202) in ldpe plant.	TASNEE	P.O Box 35579, Al-Jubail 31961, Eastern Province, Kingdom of Saudi Arabia	In-situ	79,893.48	1	5400	Main	18	31-Mar-20
16	4300323185	This Scope of Work intended to form and detail comprehensive Scope for below mentioned activities related to Phase-5 Plant during upcoming Turnaround scheduled in Jan-2020 as a Lump Sum Turn Key (LSTK) contract. [Dense fluid expander, expansion turbine, expansion turbine, MPGAN51-K-003]	SABIC-NIGC	Industrial City-2, Al-Jubail, Eastern Province, Kingdom of Saudi Arabia	In-situ	134,854.95	5	12000	Main	25	9-Mar-20
17	4500101202	Overhauling, PM task activities and replacement of equipment. Details activities of the all rotating equipment.	TASNEE	P.O Box 35579, Al-Jubail 31961, Eastern Province, Kingdom of Saudi Arabia	In-situ	171,770.97	22	12960	Main	18	23-Apr-20
18	4300273438	To carryout inspection and maintenance work on Rotating Equipment, 101-BJ, 1101-BJ, 104-J, 1101-J, 2008-UJ, 2008-UAJ, 2018-JT, 2108-J, 304-J, 401-V, 402-VG, 2201+JA, 2201-JB, 2201-JC, AND 2201-JD.	SABIC-ALBAYRONI	1700 Albayroni, PO Box 10046 31961 Al-Jubail, Eastern Province, Kingdom of Saudi Arabia	In-situ	519,307.59	20	41040	Main	38	13-May-19

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19	4300302845	Services are requried for Polymer 1 & 2 Unit Line Tentative Date (Duration)	SABIC-YANPET	1300 Yanpet, Postal Code 21441 Yanbu, Western Province, Kingdom of Saudi Arabia	In-situ	226,964.05	1	1728	Main	12	**7-Oct-19**
20	4300303488	1. Feed end bearing, bearing housing, sleeves & packing & mount plate & torque pins replacement. 2. Discharge end: bearing & packing & mount plate & torque pins replacement. 3. DSS screw: liner spool,hydraulic motor, bearings, packing, lantern, mount plate & torque pin replacement. 4. Deflector plate replacement.	SABIC-KEMYA	1500 Al Jubail Petrochemical Company, PO Box 10084 31961 Al-Jubail, Eastern Province, Kingdom of Saudi Arabia	In-situ	276,830.89	1	25200	Main	35	**13-Oct-19**
21	4503701411	The services include access to the equipment and execution of all mechanical activities related thereto. vendor shall provide competent OEM Specialist/Supervisor, Lead Technicians, Millwright Technicians, Foreman, Planner and related high-skilled and semi-skilled personnel who will ensure the smooth execution of the servicing requirement. vender shall follow OEM instructions in order to perform required work activities, approved in concurrence with Saudi Kayan ensuring timely completion of the job. vendor shall provide continuous 24-hours coverage in 2 shifts to perform its required services.	SABIC-SAUDI KAYAN	SK Warehouse,Gate No 01, Tareeg 160, PO Box 10302 Al Jubail 31961, Eastern Province, Kingdom of Saudi Arabia	In-situ	106,272.17	1	3840	Main	8	**14-Nov-19**
22	4600008278	To outsource from the local contractor, to carry out removal and installation of the main extruder motor.	TASNEE	P.O Box 35579, Al-Jubail 31961, Eastern Province, Kingdom of Saudi Arabia	In-situ	35,078.03	1	1200	Main	4	**5-Dec-19**
23	4300427054	PPIII VRC MAINTENANCE LSTK SERVICE TA'21 1. De-bliding & Bliding of VRC compressor &its auxillary equipment. 2. electrical & instrumentaion cable & equipment dis-connection & connection to be done in presence of IZ executives. 3. disconnection & connection of cooling water pipe. 4. de-couple & couple the compressor motor. 5. drain & re-filling of lube oil 6. compressor valves removal & installation. 7. cross head bearing inspection & clearance to be check. 8. piston and cylinders clearances to be check. 8. piston pre-tension to be check by dismantling the piston. 9. connecting rod bearing condition to be check. and the bearing clearances to be check. and DP test to be done. 10.crank shaft main bearing condition to be check. and bearing clearance be check and DP test to be done. 7. measure & record all area clearances before dismantiling & during assembly of the compressor components. 7. replacement of oil scrappers, oil shields, & gas packing. 9. replacement of all main bearings, connecting rod big &small end bearings and guide bearings. 10. replacement of cross head. 11. replacement of connecting rod. 12. replacement of crank shaft seal. 13. replacement of piston skirts. 14. replacement of pistons based on IZ recommendation 15. piston rod run out to be measure and run out values to be maintenanced as per IZ /OEM guidelines. 15. compressor's pre-start lube oil pump & main lube oil pump maintenance as follows	SABIC-IBN ZAHR	3300 IBN ZAHR Saudi European Petrochemical PO Box 10330 31961 Al-Jubail	**In-situ**	193,371.50	1	7200	Main	12	**2021**
24	4300419837	PPIII CGC's IGV MAINT. LSTK SERVICE TA21 1. De-bliding & bliding of compressor &its auxillary equipment. 2. electrical and instrumentaion cable & equipment dis-connection & connection to be done in presence of IZ executives. 3. remove the compressor volute casing cover to access the impeller from IGV side for cleaning of impeller and internals of the volute casing. 4. removal &re-installation of the inlet pipe spool & IGV. 6. removal of upstream spool to work on IGV assembly (by other contractor) 7. removal of complete housing from igv assembly. 8. removal of pneumatic cylinders (2 nos) and connected tubing. 9. removal connection links between cylinders and IGV 10. removal of IGV vanes. 11. replace all wear parts in IGV vanes. 12. inspect all links connecting vanes to cylinders and ring assembly and replace. 13. assemble the vane assemblies and connected ring assembly. 14. connect all the links and install housing. 15. install pneumatic cylinders and link assemblies. 16. operate and check for proper movement and verify the openings and alignment from positioner and DCS.	SABIC-IBN ZAHR	3300 IBN ZAHR Saudi European Petrochemical PO Box 10330 31961 Al-Jubail	**In-situ**	185,837.55	3	7920	Main	12	**2021**
25	4300359748	EXTRUDER B OVERHAULING -Removal & Reinstallation of canopy -Removal & Reinstallation of all temp & vibration probes -Removal & re-installation of level switches -Disconnection of electrical oil heaters -Auxiliary motor disconnection / Connections -Remove all the coupling guards + Removal & Re-installation of all lube oil piping -De-couple / Couple main motor + the gear box form extruder screw coupling -Disconnect & remove rotary union Desch coupling assembly & Re- Assembling -Removal / Re-assemble thrust bearing -Unbolt/Separate/Remove end cover of Shaft#1 & Reassembly	SABIC-KEMYA	**1500 Al Jubail Petrochemical Company** **Kemya** **PO Box 10084** **31961 Al-Jubail**	In-situ	72,450.07	1	2520	Main	6	**2021**
26	EMAIL	To carry out the overhauling Overhauling of Passivation air compressor (52-K202 A & 52-K 202B)	SABIC-SAFCO	Safco Saudi Arabian Fertilizer Co. Al-Jubail	**In-situ**		2	4896	Main	12	**2021**
27	4300422104	CGC overhual during upcoming GLY-2 TA in OCT 2021 Compressor: - Take all safety precautions and permits to start the job. - Follow OEM engineer guidelines/supervision and quality measurement/correction requirements. - Submit daily activity report and highlight any concern. - Perform visual inspection of the compressor and its related connection and record any observation. - Take as found reading for alignment. - Drop the coupling spacer and take as found measurements for shaft axial float and DBTS. - Inspect the coupling condition. - Disconnect the related connections from the compressor body and check/record any observation. - Disconnect all instrumentations related to the activity from the compressor body/area (instrumentation activity). - Dismantle the compressor as per the disassembly procedure and take all as found measurement. - Make all necessary inspections for compressor components as per the QA/QC plan and as per Yanpet and OEM engineer recommendations. - Replace all soft materials with new. - Replacement of major parts as per Yanpet and OEM recommendations. - During assembly, follow the QA/QC plan and take all measurements. - Report any deviation/findings and don't assemble with any deviation without OEM/Yanpet approval. - All corrections to be made as per the QA/QC plan and Yanpet/OEM instructions/approval. - Flush and clean all related piping and tubes before re-connecting them back to the compressor. Consider to use gasket with inner ring in the dry gas seal connection. - Re-connect all related instrumentations. Make sure all of them are healthy (instrumentation activity). - Make sure to set the adjustment for vibration probes voltage gap and to ensure the healthiness of all RTDs (instrumentation activity). - Take compressor axial float and keep the shaft in the center for axial probe adjustment with instrumentation team. - Measure the DBTS and make sure it is within the design value. - Check the alignment between the compressor and motor and correct if required	SABIIC-YANPET	1300 Yanpet Saudi Yanbu Petrochemical Co. Postal Code 21441, YANBU	In-situ	173,721.37	2		Main	38	**13-Jul-05**
28	4500423975	To carry out CHEVRON for 45X03 –Overhauling the gear box in GAS Facility.	SAUDI CHEVRON PHILLIPS CO.	P. O. Box 11221 Jubail Industrial City 31961, Saudi Arabia	GAS Jubail workshop	68,308.92	1	792	Main	3	**26-Sep-21**

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SATORP-Company General Use

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S-CHEM Organiational Chart

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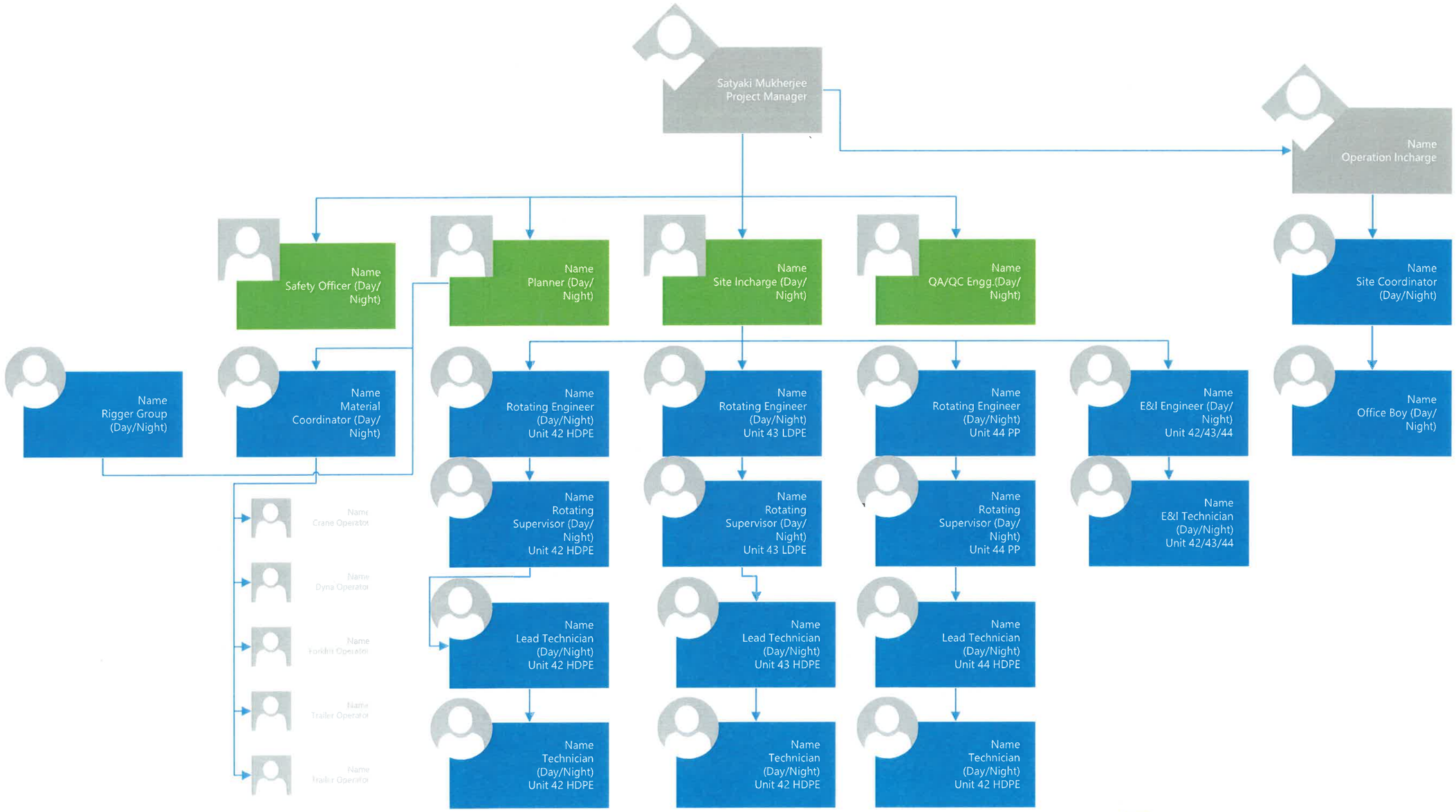
S-CHEM ORGANIZATION CHART



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Pre-Bid Clarification REQ 25000942 Site Execution On Extruder Machines (SPCo TA 2022)- REV 01

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PRE-BID CLARIFICATION REQ 25000942 Site Execution Service ,Inspection And Overhaul On Extruder Machines (SPCo TA 2022)

Date:	26.10.2021		RFQ NO :	25000942	END-USER :	S-CHEM (CHEVRON)
JOB DESCRIPTION :		Site Execution Service ,Inspection And Overhaul On Extruder Machines (SPCo TA 2022) In PP (44), LDPE (43) & HDPE (42)				

SR. NO	AGENDA	PLANT	UNIT	DESCRIPTION OF QUERY / CLARIFICATION	FEEDBACK FROM END-USER	REMARKS
1	BARREL	HDPE	42	BARREL REPLACEMENT WE WILL CONSIDER OR NOT, AS IN THE SOW IT IS MENTIONED THAT BASED ON INSPECTION, SO IF IT IS BASED ON INSPECTION DECIDED TO BE REPLACED, THEN IT WILL IMPACT ON THE MANHOURS - PLEASE CONFIRM	If anything is found during the test, replace the new barrel,coperion will decide	PAGE 09 IN SOW, JOB ID SPCO-SP-0726
2	NDT	HDPE	42	AS PER SOW NDT WILL BE TAKEN CARE BY S-CHEM - PLEASE CONFIRM	Schem	PAGE 59 IN SOW, CLAUSE (L)
3	COBRA MEASUREMENT	HDPE	42	COBRA MEASUREMENT TOOLS WILL NOT BE UNDER GAS SCOPE - PLEASE CONFIRM	Schem/COPERION	PAGE 09 IN SOW, JOB ID SPCO-SP-0726
4	ADDITIONAL	HDPE	42	WE VISITED 02 EXHAUST FAN & 01 SCREENER, IT IS OUT OF SCOPE BUT WE WERE TOLD TO INCLUDE THE SAME IN OUR PROPOSAL - PLEASE CONFIRM	Not part of bid, Schem	REFER TODAY'S SITE VISIT
5	OIL ACCUMULATOR	HDPE	42	OIL ACCUMULATOR WILL BE DONE BY S-CHEM INSTRUMENT TEAM - PLEASE CONFIRM	**Not part of bid,** Schem	REFER TODAY'S SITE VISIT
6	BRAIDED HOSES	HDPE	42	BRAIDED HOSES WILL BE DONE BY S-CHEM STATIC TEAM - PLEASE CONFIRM	Not part of bid, Schem	REFER TODAY'S SITE VISIT
7	TORQUING	HDPE	42	TORQUING WILL BE S-CHEM SCOPE - PLEASE CONFIRM	**Contractor scope**	REFER TODAY'S SITE VISIT
8	CRANE	HDPE	42	CRANE FOR WORKING FOR THE ACTIVITIES MENTIONED IN THE SOW, WILL BE PROVIDED BY S-CHEM - PLEASE CONFIRM	All rigging activity, crane, material handling under contractor scope	REFER TODAY'S SITE VISIT
9	DIE PLATE	HDPE	42	REMOVED DIE PLATE TRANSPORTATION TO COPERION W/S WILL BE BY S-CHEM - PLEASE CONFIRM	Schem	PAGE 10 IN SOW, JOB ID SPCO-SP-0731
10	LEAK TEST (BARREL)	PP	44	WHAT IS THE SOURCE OF LEAK TEST? WILL BE BY N2 / PRESSURIZED AIR? WHO WILL PERFORM? - PLEASE CONFIRM	Barrel replacement, Leak test not **required**	PAGE 21 IN SOW, JOB ID SPCO-SP-1864
11	NDT	PP	44	AS PER SOW NDT WILL BE TAKEN CARE BY S-CHEM - PLEASE CONFIRM	Schem	PAGE 59 IN SOW, CLAUSE (L)
12	COBRA MEASUREMENT	PP	44	COBRA MEASUREMENT TOOLS WILL NOT BE UNDER GAS SCOPE - PLEASE CONFIRM	Schem/COPERION	PAGE 21 IN SOW, JOB ID SPCO-SP-1864
13	ADDITIONAL	PP	44	WE VISITED 01 EXHAUST FAN & 01 SCREENER, IT IS OUT OF SCOPE BUT WE WERE TOLD TO INCLUDE THE SAME IN OUR PROPOSAL - PLEASE CONFIRM	Not part of bid, Schem	REFER TODAY'S SITE VISIT
14	OIL ACCUMULATOR	PP	44	OIL ACCUMULATOR WILL BE DONE BY S-CHEM INSTRUMENT TEAM - PLEASE CONFIRM	Not part of bid, Schem	REFER TODAY'S SITE VISIT
15	BRAIDED HOSES	PP	44	BRAIDED HOSES WILL BE DONE BY S-CHEM STATIC TEAM - PLEASE CONFIRM	Not part of bid, Schem	REFER TODAY'S SITE VISIT
16	TORQUING	PP	44	TORQUING WILL BE S-CHEM SCOPE - PLEASE CONFIRM	**Contractor scope**	REFER TODAY'S SITE VISIT
17	CRANE	PP	44	CRANE FOR WORKING FOR THE ACTIVITIES MENTIONED IN THE SOW, WILL BE PROVIDED BY S-CHEM - PLEASE CONFIRM	All rigging activity, crane, material handling under contractor scope	REFER TODAY'S SITE VISIT
18	DIE PLATE	PP	44	REMOVED DIE PLATE TRANSPORTATION TO COPERION W/S WILL BE BY S-CHEM - PLEASE CONFIRM	Schem	PAGE 18 IN SOW, JOB ID SPCO-SP-1806
19	03 BOLTS FOR GEAR BOX	LDPE	43	AS PER THE SOW, LDPE SECTION CLAUSE NO 2.2, IT IS MENTIONED THAT 03 BOLTS NEEDS TO BE REPAIRED / RECTIFIED, WHAT TYPE OF REPAIR / RECTIFICATION IS REQUIRED, IT IS NOT CLEAR IN THE SOW - CLARIFICATION REQUIRED	ReThread	PAGE 17 IN SOW, JOB ID SPCO-SP-2483
20	LEAK TEST (BARREL)	LDPE	43	07 BARRELS NEEDS TO BE REPLACED DUE TO POLYMER LEAK, SO WHAT IS THE SOURCE OF LEAK TEST? WILL BE BY N2 / PRESSURIZED AIR? WHO WILL PERFORM? - PLEASE CONFIRM	Barrel replacement, Leak test not required	PAGE 14 IN SOW, JOB ID SPCO-SP-0743
21	NDT	LDPE	43	AS PER SOW NDT WILL BE TAKEN CARE BY S-CHEM - PLEASE CONFIRM	Schem	PAGE 59 IN SOW, CLAUSE (L)
22	COBRA MEASUREMENT	LDPE	43	COBRA MEASUREMENT TOOLS WILL NOT BE UNDER GAS SCOPE - PLEASE CONFIRM	Schem/COPERION	PAGE 14 IN SOW, JOB ID SPCO-SP-0743
23	ADDITIONAL	LDPE	43	WE VISITED 02 EXHAUST FAN & 01 SCREENER, IT IS OUT OF SCOPE BUT WE WERE TOLD TO INCLUDE THE SAME IN OUR PROPOSAL - PLEASE CONFIRM	Not part of bid, Schem	REFER TODAY'S SITE VISIT
24	OIL ACCUMULATOR	LDPE	43	OIL ACCUMULATOR WILL BE DONE BY S-CHEM INSTRUMENT TEAM - PLEASE CONFIRM	Not part of bid, Schem	REFER TODAY'S SITE VISIT
25	BRAIDED HOSES	LDPE	43	BRAIDED HOSES WILL BE DONE BY S-CHEM STATIC TEAM - PLEASE CONFIRM	Not part of bid, Schem	REFER TODAY'S SITE VISIT
26	TORQUING	LDPE	43	TORQUING WILL BE S-CHEM SCOPE - PLEASE CONFIRM	Contractor scope	REFER TODAY'S SITE VISIT
27	CRANE	LDPE	43	CRANE FOR WORKING FOR THE ACTIVITIES MENTIONED IN THE SOW, WILL BE PROVIDED BY S-CHEM - PLEASE CONFIRM	All rigging activity, crane, material handling under contractor scope	REFER TODAY'S SITE VISIT
28	DIE PLATE	LDPE	43	REMOVED DIE PLATE TRANSPORTATION TO COPERION W/S WILL BE BY S-CHEM - PLEASE CONFIRM WHO WILL TRANSPORT & WHETHER IT IS REQUIRED TO TRANSPORTED OR NOT, AS IT IS NOT MENTIONED IN THE SOW	Schem	PAGE 15 IN SOW, JOB ID SPCO-SP-0748

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QUALITY PACKAGE

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Project Quality Plan

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GAS Arabian Services Company

Project Quality Plan
For

INSPECTION & OVERHAUL ON EXTRUDER MACHINES AT UNIT 42, 42, & 43- LSTK

SPCo SP- TA 2022

(GAS-S-CHEM-QA-PQP-001)

Rev. 0

"RFP NO -460000"

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Prepared by: QA/QC Engineer	Reviewed by: QA/QC Lead	Approved by: Project Manager	Date of approval:	Revision No.
Balakrishnan	Shahnawaz Alam	Satyaki Mukherjee	26-OCT-2021	0

S. Mukherjee

1	0	All	Issued for Approval	26-10-2021

Note: Where revisions affect the whole document, no identification will be placed adjacent to the revised paragraph.

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2	GAS	Project Manager	Controlled Copy	
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1.0 Introduction:

This quality plan is **Gas** Arabia's interpretation of ISO 9001:2015 that will define our approach to process and ensuring customer satisfaction to quality and products. Such processes are created, implemented, documented and maintained & Continual Improvement as per the customer and contract requirement, and other applicable code, standards statuary & regulatory requirement.

THE ACTIVITIES INTEND TO EXECUTE IN THIS PROJECT ARE DEFINED IN THE SCOPE OF RFP NO. 460000 PROVIDED BY THE S-CHEM CUSTOMER FOLLOWING S-CHEM STANDARDS FOR INSPECTION & OVERHAUL ON EXTRUDER MACHINES AT UNIT 42, 42, & 43- LSTK SPCO SP- TA 2022

The work shall be executed under the coordination, operational and technical management of SADARA.

GAS quality assurance procedures referenced in this **GAS-S-CHEM-QA-PQP-001 Project Quality Plan** form an integral part of the proposed Project Quality Plan.

- The ability to consistently provide products and services that meet customer and applicable Statutory and Regulatory requirements.
- The ability to plan our processes and their interactions by employing the Plan-Do-Check-Act (PDCA) cycle and risk-based thinking in our daily project execution activities.
- Addressing risks and opportunities associated with its context and objectives.

1.1 Scope:

THE QUALITY MANAGEMENT SYSTEM DESCRIBED HEREIN COMPLIES WITH THE REQUIREMENT OF ISO 9001-2015 AND RFQ NUMBER: 1001184078 COMPRISING OF THE INSPECTION & OVERHAUL ON EXTRUDER MACHINES ATUNIT 42, 42, & 43- LSTK SPCO SP- TA 2022

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DESCRIPTION OF WORK:

SCOPE OF WORK – FOR INSPECTION & OVERHAUL ON EXTRUDER MACHINES AT UNIT 42, 42, & 43- LSTK SPCo SP- TA 2022

UNIT 42 (HDPE)

Sr. No.	Equipment	Scope of work - Activities
1.1	Extruder Tag No: 42V80	1. Remove screw shafts for wear measurement. 2. Hydro blast polymer from screw shafts. 3. Unstack screw shaft elements for inspection for wear & Replacement (AWR) as recommended. 4. Verify spare screw timing using roll test before installing in barrels. 5. Clean elements and NDT splines for cracks. 6. Clean and NDT screw shaft for cracks. 7. Hydro blast barrels for inspection. 8. Measure barrel wear using COBRA instrumentation. 9. Remove barrels to replace gaskets if required due to polymer leaks. 10. Overhaul the screw shaft seal if worn, replace the sealing set. 11. Check all heating and cooling connection piping and valves. 12. Check the instruments, N2 control unit of Meco seals. 13. Chemical cleaning by Acid flushing all barrel sections. 14. Perform leak test for cooling and heating circuits. 15. Replace Meco seals. 16. Grease the screw shaft couplings.
1.1	Extruder Startup valve DAV - 42A404 Tag No. 42 DAV	1. Remove DAV plug and clean excessive polymer leak. 2. Remove DAV/SUV housing for screw removal. 3. Replace hydraulic cylinder. 4. Hydro blast DAV to remove degraded polymer.
1.1	Screen pack changers Tag No: 42A405	1. Remove screen changer housing for screw removal. 2. Remove sliders to clean and lubricate. 3. Hydro blast S/C after removal to remove degraded polymer. 4. Replacement of screen elements (independent from shut-down activity). 5. Drain hydraulic fluid from cylinders. 6. Disconnect Hydraulic oil supply and return hoses. 7. Replace hydraulic oil hoses.

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1.1	SPC/DAV Hydraulic system Tag No: 42T90	Change the Hydraulic oil.
1.1	Tag No: 42A409 - Die-plate	To Replace on insulation ring bolts on die plate Replace die-plate
1.1	Pelletizer Tag No: 42A410	1. Replace O-Ring at pelletizer water box. 2. Check and repair sealing face of water box. 3. Replace all bearings, seals, and O-rings of the knife shaft bearing assembly. 4. Replace the distance bushing for angular contact bearings on shaft. 5. Knife adjustment: Check hydraulic cylinders for leakage. 6. Replace springs and O-Rings of docking pins. 7. Replace docking pin and docking cylinders on the pelletizer. 8. Check of cardan-shaft for backlash and re-lubrication. If required replace. 9. Replace coupling insert between motor and gearbox. 10. Replace of hydraulic oil filter. 11. Change hydraulic oil. 12. Pelletizer movement: Check hydraulic cylinder for leakage: 14. Replace the gearbox bearings and inspect the gears and shafts and replace the seal. 15. Replace the Motor Bearings.
1.1	Pelletizer hydraulic oil system Tag No: 42T85	Change the Hydraulic oil.
1.1	Die Head Housing Tag No: 42A408	1. Remove Die Head Housing 2. Clean (Hydro jetting) and inspect
1.2	Extruder gearbox Tag No: 42A203	1. Remove all gears shafts for bearing replacement and inspection of gears. 2. Check function of lubrication system to bearings and gear. 3. Change oil and filters. 4. Replace superposition drive backstop. 5. Replace all bearings, seals, and rotary union. 6. Verify timing of shafts. 7. Inspect lube oil piping for cracks. 8. NDT shaft and gears. 9.Inspect the Desch coupling (Friction Unit) 10.Replace Desch coupling bolts (Friction unit) 11. Replace Desch coupling flexible elements (buffer) 12.Inspect / replace Friction unit
1.2	Extruder Motor Tag No: 42XM80	Solo run the motor and verify magnetic running center of the shaft so placement of the shaft position can be done when coupling to the gear box.

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1.3	Pellet Dewatering Dryer Tag No: 42X84	1. Replace the Dryer screens. 2. Replace the Top & bottom Bearings & seals, 3. Replace inlet filter. 4. Inspect sprocket and replace belt.
1.3	Pellet Dewatering Dryer Tag No: 42X85	5. Replace the Dryer screens. 6. Replace the Top & bottom Bearings & seals, 7. Replace inlet filter. 8. Inspect sprocket and replace belt.
	UNIT 43 (LDPE)	
2.1	Extruder 43V80	1. Remove screw shafts for wear measurement. 2. Hydro blast polymer from screw shafts. 3. Unstack screw shaft elements for inspection for wear & Replacement (AWR) as recommended. 4. Verify spare screw timing using roll test before installing in barrels. 5. Clean elements and NDT splines for cracks. 6. Clean and NDT screw shaft for cracks. 7. Hydro blast barrels for inspection. 8. Measure barrel wear using COBRA instrumentation. 9. Replace 7 Barrels & gaskets if required due to polymer leaks. (AWR) 10. Overhaul the screw shaft seal if worn, replace the sealing set. 11. Check all heating and cooling connection piping and valves. 12. Check the instruments, N2 control unit of Meco seals. 13. Chemical cleaning by Acid flushing all barrel sections. 14. Perform leak test for cooling and heating circuits. 15. Replace Meco seals. 16. Grease the screw shaft couplings.
2.1	Extruder Startup valve DAV - 43A404 Tag No: 43DAV	1. Remove DAV plug and clean excessive polymer leak. 2. Remove DAV/SUV housing for screw removal. 3. Replace hydraulic cylinder. 4. Hydro blast DAV to remove degraded polymer.
2.1	Screen pack changers Tag No: 43A405	1. Remove screen changer housing for screw removal. 2. Remove sliders to clean and lubricate. 3. Hydro blast S/C after removal to remove degraded polymer. 4. Replacement of screen elements (independent from shut-down activity). 5. Drain hydraulic fluid from cylinders. 6. Disconnect Hydraulic oil supply and return hoses. 7. Replace hydraulic oil hoses.

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2.1	SPC/DAV Hydraulic system Tag No: 43T90	Change the Hydraulic oil
2.1	Tag No: 43A409 - Die- plate	To Replace on insulation ring bolts on die plate Replace die-plate
2.1	Pelletizer Tag No: 43A410	1. Replace O-Ring at pelletizer water box. 2. Check and repair sealing face of water box. 3. Replace all bearings, seals, and O-rings of the knife shaft bearing assembly. 4. Replace the distance bushing for angular contact bearings on shaft. 5. Knife adjustment: Check hydraulic cylinders for leakage. 6. Replace springs and O-Rings of docking pins. 7. Replace docking pin and docking cylinders on the pelletizer. 8. Checking of cardan-shaft for backlash and re-lubrication. If required replace. 9. Replace coupling between motor and gearbox. 10. Replace hydraulic oil filter. 11. Change hydraulic oil. 12. Pelletizer movement: Check hydraulic cylinder for leakage: 14. Replace the gearbox bearings and inspect the gears and shafts and replace the seal. 15. Replace the Motor Bearings.
2.1	Pelletizer hydraulic oil system Tag No: 43A85	Change the Hydraulic oil.
2.1	SPC (Screen Pack Changer) Tag No:43X80	Need to Fix Polymer Leak from Screen Pack Changer Side. Notification # 11819169
2.1	Die Head Housing Tag No:43A408	1. Remove Die Head Housing 2. Clean (Hydro jetting) and inspect

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2.2	Extruder gearbox Tag No:43A203	1. Remove all gears shafts for bearing replacement and inspection of gears. 2. Check function of lubrication system to bearings and gear. 3. Change oil and filters. 4. Replace superposition drive backstop. 5. Replace all bearings, seals, and rotary union. 6. Verify timing of shafts. 7. Inspect lube oil piping for cracks. 8. NDT shaft and gears. 9. Inspect the Desch coupling (Friction unit) 10.Replace Desch coupling bolts (Friction unit) 11. Replace Desch coupling flexible elements (buffer)
2.2	Gearbox Tag No:43X80-V80	Three bolts on the gearbox need to be repaired. Rotating Reliability engineer and Coperion vendor will have to determine the type of repair necessary. Notification # 11818912
2.2	Extruder Motor Tag No:43XM80	After solo run alignment to be checked & corrected (if required)
2.3	Pellet Dewatering Dryer Tag No:43X84	Replace the Dryer screens. Replace the Top & bottom Bearings & seals, Replace inlet filter. Inspect sprocket and replace belt.
2.3	Pellet Dewatering Dryer Tag No:43X85	Replace the Dryer screens. Replace the Top & bottom Bearings & seals, Replace inlet filter. Inspect sprocket and replace belt.
	UNIT 44 (PP)	
3.1	Pelletizer Tag No: 44A410	1. Replace O-Ring at pelletizer water box. 2. Check and repair sealing face of water box. 3. Replace Pelletizer Knife Shaft Assembly with Warehouse stock. 4. Removed Pelletizer Knife Shaft Assembly need to Be Overhauled (Replace all bearings, seals, and O-rings of the knife shaft bearing assembly, Replace the distance bushing for angular contact bearings on shaft)

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	Pelletizer Tag No: 44A410	5. Knife adjustment: Check hydraulic cylinders for leakage. 6. Replace springs and O-Rings of docking pins. 7.Replace docking pin and docking cylinders on the pelletizer. 8. Checking of cardan-shaft for backlash and re-lubrication. If required replace. 9. Replace of hydraulic oil filter. 10. Change hydraulic oil. 11. Pelletizer movement: Check hydraulic cylinder for leakage:
3.1	44V80- Throttle Valve Tag No: 44X92	1. Remove DAV plug and clean the excessive polymer leak. 2. Remove DAV/SUV housing for screw removal. 3. Replace hydraulic cylinder. 4. Hydro blast DAV to remove degraded polymer.
3.1	44V80- Start Up Valve (DAV) Tag No: 44X93	1. Remove DAV plug to clean the excessive polymer and inspection. 2. Remove DAV/SUV housing for screw removal. 3. Replace hydraulic cylinder soft kits. 4. Hydro blast DAV to remove degraded polymer.
3.1	44V80- Screen Pack Changer A Tag No: 44X94A	1. Drain hydraulic fluid from cylinders. 2. Disconnect Hydraulic oil supply and return hoses. 3. Remove screen changer housing for screw removal. 4. Hydro blast S/C after removal to remove degraded polymer. 5. Remove sliders to clean and lubricate 6. Replacement of screen elements 7. Replace hydraulic oil hoses
3.1	44V80- Screen Pack Changer B Tag No: 44X94B	1. Drain hydraulic fluid from cylinders. 2. Disconnect Hydraulic oil supply and return hoses. 3. Remove screen changer housing for screw removal. 4. Hydro blast S/C after removal to remove degraded polymer. 5. Remove sliders to clean and lubricate 6. Replacement of screen elements (independent from shut- down activity). 7. Replace hydraulic oil hoses
3.1	44V80- Pelletizer Hydraulic Oil Tank Tag No: 44T85	1. Change the Hydraulic oil. 2. Tank Cleaning. 3. Suction screen/ strainer cleaning.
3.2	44V80- Extruder (Zone/Barrels) Tag No: 44X80	1. Disconnect/Connect Barrel Cooling Water (BCW) supply and return connections from/to the barrels. 2. Disconnect/Connect HP steam supply and condensate return connections from/to the barrels. 3. Remove screw shafts for wear measurement. 4. Hydro blast polymer from screw shafts. 5. Unstack screw shaft elements for replacement due to wear.

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	44V80- Extruder (Zone/Barrels)	6. Verify spare screw timing using roll test before installing in barrels. 6a; Screw & Elements would be available for replacement and if required, these would be replaced. (AWR) 7. Clean elements and NDT splines for cracks. 8. Clean and NDT screw shaft for cracks. 9. Remove barrels and Hydro blast for inspection. Kindly confirm whether required leak test for barrel. (It will be evaluated after the barrels inspection as per rotation equipment department comment) 9a. Barrels 2 to 9 is recommended for Replacement. (AWR) 10. Measure barrel wear using COBRA instrumentation (by OEM). 12. Overhaul the screw shaft seal if worn, replace the sealing set. 13.Replace barrels gaskets. 14. Check all heating and cooling connection piping and valves. 15. Check the instruments, N2 control unit of Meco seals. 16. Acid (Chemical Cleaning) flush all barrel sections by third party support. (Please refer the line item # SPCo-SP-2651) 17. Replace Meco seals. 18. Grease the screw shaft couplings.
3.2	44V80- Die Head Housing Zone Tag No: 44A408	1. Remove Die Head Housing 2. Inspect and Clean (Hydro jetting)
3.2	44V80- Extruder Gear Box Tag No: 44A203	1. Remove all gears shafts for bearing replacement and inspection of gears. 2. Check function of lubrication system to bearings and gear. 3. Change oil 4. Replace Auxiliary drive backstop. 5.Replace all bearings, seals, and rotary union. 6. Verify timing of shafts. 7. Inspect lube oil piping for cracks. 8. NDT shaft and gears. 9. Inspect the Desch coupling (Friction unit) 10. Replace Desch coupling bolts (Friction unit) 11. Replace Desch coupling flexible elements (buffer)
3.3	44V84- Pellet Dewatering Dryer Tag No: 44X84	1. Replace the Top & bottom Bearings. 2. Replace the seals, inlet filter 3. Inspect the rotor assembly 4. Replace Belt. 5. Inspect the Sprocket 6.Inspect the screen and replaced if required. (with warehouse stock)
10	Final inspection by Sadara team & OEM.	

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11	Clear the job area and Return to Operation (RTO)

2. Normative Reference

Document Related to this Quality Plan includes:

ISO 9001:2015	**Quality Management Systems – Requirements**
ISO 10005:2005	**Guidelines for quality plans**
Appendix 11.1	List of Documented Quality Assurance Procedures and Forms.
Appendix 11.2	Organizational Structure.

3. Terms & Definitions

Quality System: Organizational structure, procedures, processes and resources needed to implement quality management. (ISO 9001-2015)

Quality: Totality of characteristics of any entity that bear on its ability to satisfy stated and implied needs.

Quality Management: All activities of the overall management function that determine the quality policy, objectives and responsibilities and its implementation such as quality planning, quality control, quality assurance and quality improvement within the quality system.

Quality Plan: Document specifying which procedures and associate resources shall be applied by whom and when to a specific project, product, process or contract. (ISO 9001-2015)

Quality Policy: Overall intentions and detection of an organization with regard to quality, as formally expressed by the top management.

Quality Audit: Systematic and independent examination to determine whether quality activities and related result comply with plan arrangements and whether these arrangements are implemented effectively and are suitable to achieved objectives.

Quality Auditor: Person qualified & designated to perform quality audit.

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Auditee: Organization or person being audited.

Quality Assurance: All the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfill requirements for quality.

Quality Control: Operational techniques and activities that are used to fulfill requirement for quality.

NCR: Non conformance report "NCR" is a non-fulfillment to the specified standard requirement.

Quality Procedure: A QP quality procedure is a documented procedure detailing the processes necessary to complete a specific work activity.

Corrective Action: Action to eliminate the causes of an existing non-conformity or other undesirable situation in order to prevent recurrence.

Preventive Action: Action to eliminate the causes of a potential non-conformity, defects or other undesirable situation in order to prevent occurrence.

SADARA: SADARA, wherein the project will be executed

4. Context of the Organization related to the Project.

4.1 Understanding the Organization and its Context related to the project.

Gas Arabian Services Co. Ltd has determined external and internal issues that are relevant to its purpose and its strategic direction and that affect its ability to achieve the intended results of its Quality Management System for the project. GAS monitors and reviews information about these external and internal issues related to the project execution.

GAS shall monitor and review the information about the external and internal issues periodically with a focus on below issues.

Possible Internal issues are related to the Project: The size, structure and locations of the organization, its values and culture and achievement of objectives, how it performs project assigned resources, including competence and demography of the workforce related to project execution etc.

Possible external issues are: Political, Financial, Technological, Economic, Social, Legal / Regulatory, and Environmental etc.

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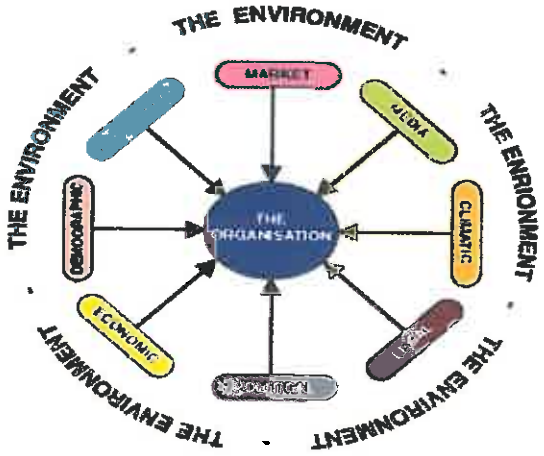

The Relevant Interested parties:

- Owner / Share Holder/Top Management.
- Customer
- Employees
- Divisions / Sister Companies
- Supplier / Partner / Agents/ Sub-Contractors
- Regulatory Authorities

4.2 Scope of the Quality Management System

Before starting the project execution, Gas Arabian Services Co. Ltd. (GAS) shall identify all processes involved in the project. GAS shall identify the sequence and interaction of these processes, resources required, information required to support the execution, monitor, and measure and analyze these processes, etc. GAS will submit its Quality Plan and Personnel Qualification to Customer Representative for review and approval as stipulated in accordance with the contractual requirements prior to the scheduled start date of the Design, procurement, construction and pre-commissioning phases as specified in the Work Schedule provided.

Moreover, the Quality System described in the Quality Plan demonstrates that GAS has a planned and systematic approach for obtaining and maintaining quality. It shows that personnel have the necessary training to perform their work and definitions for quality

and quality related activities and same are reflected in the documented system and represent GAS's interpretation to suit Customers & its own objectives.

The Project key personal team and Quality Manager shall hold meetings weekly basis with the Quality Control Inspectors to review outstanding items, upcoming activities, etc.

The use of statistical methods is beneficial to assist in making best use of Customer's & GAS requirements and expectations, in process control in defect avoidance and in problem analysis, in finding root causes, process limits, forecasting, verification, measurement or assessment of quality.

Rotary techniques may include the following but not limited to:

Mechanical Inspection and testing

Reoccurrence of Non-conformities.

Rejection of RFI's

GAS shall perform Quality Management Functions for all parts of the work, including its Sub-contractors, Vendors, Manufacturers and Suppliers work as specified in the Contractor's Quality Manual and approved Quality Plans.

GAS sub-contractor shall implement overall QMS functions as described in this PQP employed on the project and identified those processes, procedure and other documents that ensure effective operation and control of processes.

All sub-contractors QC activities will be monitored under the supervision of GAS assigned QA and QC Manager and Supervisors.

All the sub-contractors QC submittals shall be reviewed and approved by the GAS QA and QC Manager, Project Manager, and if required, by the Customer's representative.

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Table -2: Interested parties of GAS

Interested parties	Requirements	Monitoring & Review mechanism in GAS
External parties / Providers	- Specification – Communication	Defined in Documented information of External providers control Review in Management review

	– Payment as agreed – On time Supply of Input material (if any) – Contract – Clear Scope of Work	meetings. Weekly Project Progress Meetings.
Customer	Quality of product – On time Delivery – Response to complaint on weekly progress minutes of meeting. – Proper Communication – Improvements	Defined in documented information Mater Project RFQ log. Management review Internal Audit process Weekly / Monthly Progress Meeting and Reports. PQI Record.
Statuary and Regulatory Requirements	Complying with the statutory and regulatory requirements as defined from time to time.	Review in Management review meetings Internal Audit process
Employees	Management Support – Payments on time – Appropriate environment – Effectiveness of Quality management system	Review in Management review meetings and internal audits.

4.4 Quality Management System and its Processes

GAS has established, implemented, maintains, and continually improves a Quality Management System in accordance with the ISO 9001 2015, including the processes needed and their interactions, in accordance with the requirements of this International Standard. GAS has determined the processes needed for the Quality Management System, we retain Quality Assurance and Quality Controls Forms which provide documented information's substantiating the Process inputs and outputs accomplished as planned.

- Determined the inputs required and the outputs expected from these processes;
- Determined the sequence and interaction of these processes;
- Determined and applied the criteria and methods (including monitoring, measurements and related performance indicators) needed to ensure the effective operation and control of these processes;
- Determined the resources needed for these processes and ensure their availability;

- Assigns the responsibilities and authorities for these processes;
- Addresses the risks and opportunities as determined in accordance with the requirements
- Improves the processes and the quality management system.

Where GAS chooses to outsource any process that affects product conformity to requirements, it ensures adequate control over such processes. The type and extent of control to be applied to these outsourced processes are defined within the Quality Management System and established the Documented Procedure ***GAS-QAP-PC-005, GAS-QAP-EG-006, GAS-QAP-PRO-007 GAS-QAP-CCS-013.***

Pre-Requisites for Selection of Sub Contractors/ joint Venture Partners as outsource:

- Conformance to Quality Management System Requirements.
- Adequate Manpower, Equipment and Logistic Support.
- Conformance to Products and Work Requirements.
- Conformance to the Work Owners Requirement.
- Compliance to the Statuary and Regulatory Requirements.

Reference Procedure: **GAS-QAP-PC-005, GAS-QAP-EG-006, GAS-QAP-PRO-007 GAS-QAP-CCS-013.**

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5. Leadership

5.1 Leadership and Commitment

5.1.1 General

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Top management of GAS demonstrates leadership and commitment with respect to the quality management system by:

- Taking accountability for the effectiveness of the quality management system.
- Ensuring that the quality policy and quality objectiveness are established for the quality management system and are compatible with the context and strategic direction.
- Ensuring the integration of the quality management system requirements

- Company (GAS) Business process.
- Promoting the use of the process approach and risk-based thinking.
- Ensuring that the resources needed for the quality management system are available.
- Communicating the importance of effective quality management and of conforming to the quality management system requirements.
- Ensuring that the quality management system achieves its intended results.
- Engaging, directing and supporting persons to contribute to the effectiveness of the quality management system.
- Promoting improvement; and
- Supporting other relevant management roles to demonstrate their leadership as it applies to their areas of responsibility.

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5.1.2 Customer Focus

GAS Top Management demonstrates leadership and commitment with respect to customer focus by ensuring that:

- Customer and applicable statutory and regulatory requirements are determined, understood and consistently met.
- The risks and opportunities that can affect conformity of products and services and the ability to enhance
- customer satisfaction is determined and addressed; and
- The focus on enhancing customer satisfaction is maintained.
- Conduct Weekly Project progress Meeting and record all concerns and Address accordingly.

Reference; GAS-QAP-MR-003 Management Review

5.2 Policy

5.2.1 Developing the Project Quality Policy

Top management of GAS has established, implemented and maintains a quality policy that:

- Is appropriate to the purpose and context of GAS and supports its strategic direction.
- Provides a framework for setting quality objectives.
- Includes a commitment to satisfy applicable requirements.
- Includes a commitment to continual improvement of the quality management system.

5.2.2 Communicating the Project Quality Policy

The Quality Policy of GAS: is available and maintained as documented information and communicated, understood and applied within the organization; and is available to relevant interested parties, as appropriate.

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Quality Policy:

GAS Arabian Services Co.,Ltd.
Limited Liability Co.
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Website: www.gasarabian.com

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شركة ذات مسئولية محدودة
سجل تجاري رقم ٢٠٥٠٠٢٢٦١٧
موقع الكتروني : www.gasarabian.com

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QUALITY POLICY

GAS Arabian Services (GAS) Company Limited is committed to understanding and meeting customer needs and comply with statutory and regulatory obligations.

GAS Arabian Service Company Limited has vision to provide Quality integrated services to its customers in the kingdom, in the field of Oil and Gas, Petrochemical industries covering Engineering, Procurement, Construction, Fabrication, Commissioning and Training.

Our Mission is to provide continuously added value to our Customers, Our Principle and Staff in being fully committed to company's Quality Management System and for Continual Improvement.

Objectives are established throughout the organization to support our Quality Policy and to ensure that our duties shall perform in a manner that **"Do It Right at the First Time with Safety, On Schedule and Within Budget"**.

All employees involved in the project shall be aware of this Project Quality Plan and must adhere to the stated requirements.

FAISAL ALSUNAID
Sr. Division General Manager

Issued Date: December 2, 2016

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5.3 Project Organizational Roles, Responsibilities, and Authorities

The organization chart is illustrated in Appendices 11.1, 11.2 of this Project Quality Plan.

The responsibilities, authorities of quality personnel and their communication have been defined and documented to facilitate effective quality management. The duties, responsibilities of the key personnel are as follows:

Refer Detail on Specific Department Job Responsibility Matrix.

Project Manager:

- He will be the responsible for the management of the project. As directed by the General Manager. He shall have the Authority and responsibility for engineering, scheduling, project's quality and safety requirements and in conjunction with relation to the project.
- He shall report directly to the GAS General Manager. He will be representing GAS with customer for all matters relating to the contract.
- He will manage overall management of the project activities and control of related personnel.
- Implementation of any step which may be required to prevent or minimize delay, budget over running conditions that adversely affect the quality objectives.
- Responsible for the organization and coordination of construction activities in accordance with construction schedule while constantly monitoring the status of construction and quality services.
- Responsible for the overall administration and implementation of the project quality plan ensuring that all activities relating to quality are performed in compliance with the requirement of the relevant specifications, codes, and standards which form part of the contract.
- In coordination with quality and safety, develop and authorize inspections and test plans ensuring they are implemented and that appropriate inspections are being properly recorded and the records are maintained.
- Ensure that all personnel are deputed in their roles and responsibilities in accordance with the requirements of the Quality System.

Project Control Manager:

- Control and Manage the Projects across the company on the following.
- Schedule Management.
- Cost Management

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- Key Resource Management.
- Scope / Change management.
- Proposal Management (Bidding Decision and Costing Management).
- Strategic Planning

QA/QC Lead:

- Responsible for the implementation of GAS's project quality plan, ensuring the system complies with the requirements of ISO 9001:2015 and Customer standard requirement.
- Preparation, review, updating and distribution of the project quality plan.
- Issue of project quality Assurance and Quality Control procedures, project inspection and test plan and forms.
- Review of inspection report and related nonconformance reports.
- Evaluation of the suppliers/sub-contractor Quality system.
- Verification by means of planned audit schedule that the established quality program is being implemented by subcontractors.
- Verification by means of planned audit schedule that the requirements set in the quality plan are met.
- To ensure that the quality plan, procedures and objectives are understood and implemented within the quality assurance functions.
- Manage, coordinate and distribute project specific quality procedures, inspection & test plan and work instructions required.
- Maintain quality records and ensure those produced are collated and compiled into records.
- Review quality program plans, Procedures, Methods Statements and working instruction of Vendors/Subcontractors for adequacy in relation to ISO 9001:2015 and customer's specific requirement.
- Overall responsible for the quality control activities on the project ensure implementation of quality control procedures, work instructions, inspection and testing plans, close coordination with Customer's representative at site, liaise and assist project quality assurance manager for project quality control matters.
- Assigning quality control personnel to various areas of activity.
- Monitor inspection progress, review inspectors reports and documentation and verify upon completion of the work. That all requirements had been met and that the required quality records had been collated and filed.
- Monitor day to day cases of GAS's quality issues, and project complaints in accordance with the approved quality plan.
- Review and approve as necessary, quality control related procedure.
- Supervise & monitor activities of all QC inspectors
- Oversee the daily content and consistency of subordinate inspector's daily inspections logbooks. Controlling corrective action.
- Prepare the project quality management report.

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Engineering Manager:

Engineering Manager is the responsible for the review and evaluation of all project technical documents, he will be responsible for review and further corresponding to the design consultancy for all technical matters.

Site / Construction Manager:

The Construction Manager controls and coordinates all work activities carried out at the construction site. His responsibilities include but are not limited to:

- Establishment and implementation of work procedures for the execution of work
- Review detailed construction schedule, including redefinition of priorities, where necessary
- Control and coordination of the work entrusted to Sub-contractors
- Planning and scheduling of the work force and equipment
- Review of the materials delivery schedule
- Preparation of data required for compilation of the Work Progress Report
- Preparation of the change order proposals

Planning Engineer:

- Prepare schedule for the projects.
- Interfaces with designated site management and Customer's counterparts for effective planning and control
- Prepare Progress Measurement Sheet for each discipline/ phase of work.
- Directs, reviews and evaluates schedule durations for all discipline's activities to support the project milestones.
- Prepare progress measurement.
- Plans and organizes schedule resource loading and leveling.
- Determines quantity and manpower levels in support of project needs
- Monitors and reports critical path and schedule performance of the total project.
- Performs project schedule analysis and studies problem areas to determine criticality of schedule activities. Recommends alternatives for schedule improvement to project team for discussion and implementation
- Preparing the Bid documents schedule, Estimate the project time, participating in business negotiations
- Identifying the scope changes, with referring the contract documents, record changes and work with QS for change order cost and time implementation.
- Prepare weekly and monthly reports for Customer and head office.
- Monitor project status and advise the Area/Project Manager / In- Charge on any slippage learned during execution course.

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Safety Supervisor:

- Responsible for the implementation of GAS approved safety program in compliance with the requirements of customer safety manual and recognized national and international standards.
- To ensure that the Customer's safety program, procedures and objectives are understood and implemented within the safety function
- Conduct activities and inspection in accordance with the project safety manual.
- Maintained safety records and ensure those produced are collated and compiled into records.
- Ensure relevant Safety Precautions / Procedures are in operation and work permit requirements are complied with.
- Monitor daily activities ensuring barriers and warning signs are posted where required.

Procurement QC Supervisor / QA Engineer:

- Ensures that procurement phase quality control requirements are being fulfilled.
- Coordination with SAIR, project quality assurance manager, PM in adherence to the procurement quality control requirements.
- Review and submitting the MR's
- Review and P. O's prior to placement.
- Preparation of IAP, PIM, coordinates with TPI etc.

Construction QC Supervisor:

- Responsible for the implementation of GAS's QA/QC plan, ensuring that it complies with the requirements of ISO 9001:2015, and met with customer's requirement.
- To ensure that the quality plan, procedures and objectives are understood and implemented within the quality assurance functions.
- Review and ensure that quality procedures comply with the requirements of ISO 9001:2015, and customer's contracts.
- Manage coordinate and distribute project specific quality procedures, inspection and test plan and work instruction as required.
- Maintain quality records and ensure those produced are collected and compiled into records.
- Review quality program plans, procedures, methods statements, and working instructions of Vendors/Subcontractors for adequacy in relation to ISO 9001:2015 and customer's quality requirement.
- Submit two weeks look ahead schedule.
- Supervise & monitor activities of all QC Inspectors.

Discipline QC Inspectors:

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- Coordinate with supervisor, Customer's inspector; ensure the
- Day to day inspection activities are being adherence to the quality requirement.
- Ensure all the inspections are being performed in accordance with applicable inspection testing plan.
- Ensure the daily activities are being updated to the respective supervisor / QC Manager.
- Conduct a routine surveillance for the ongoing and planned activities at site.
- Raising the proactive / preventive notification to ensure the activities in order compliance to the requirement.
- Any quality activity that assigned by the respective supervisor.

NDT Coordinator:

- Responsible for coordination with QC Supervisor, Welding Inspector, RTFI, third party NDT agency to follow-up for NDT films and reports, ensure the RT films, assessment report is being submitted and reports are being maintained.
- Coordinate with QC Supervisor for any QC activities to be performed.

RTFI:

- Coordination with respective QC supervisor, NDT coordinator, welding Inspector in order to ensure the RT films are being received and reviewed.
- Coordinate with third party RTFI for any clarification.
- Prepare the assessment report and maintain the documented record.

Document Controller:

- Responsible for the implementation of GAS QA/QC plan and ensuring the system complies with the requirements of ISO 9001:2015 and customer requirement.
- The document controller shall manage all the information concerning the project.
- Promote of the formal management of the information system.
- Interface with peripheral units and sites to activate training on the use of the info system.
- Record and manage incoming and outgoing correspondence.
- Distribute documents in controlled manner.
- Organized the correspondence achieve and make sure that this is aligned with the one on site.

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GAS Top management ensures that the responsibilities and authorities for relevant roles are assigned, communicated and understood within GAS assigns the responsibility and authority for:

- Ensuring that the quality management system conforms to the requirements of this International Standard ISO 9001 :2015 and project Specific requirement.

- Ensuring that the processes are delivering their intended outputs.
- Reporting on the performance of the quality management system and on opportunities for improvement.
- Ensuring the promotion of customer focus throughout GAS Project Management.
- Ensuring that the integrity of the quality management system is maintained when changes to the quality management system are planned and implemented.

Reference procedure: GAS-QAP-MR-003 Management Review.

6. Planning

6.1 Project Risk Management "Actions to Address Risks and Opportunities"

GAS has established the Risk Management Procedure to ensure its Quality Management system considering issues as referred in organization and project management context and the requirements of interested parties while determining the risks and opportunities with actions on below as a minimum.

- To ensure that the Quality Management system can achieve the intended results.
- To enhance the desirable effects
- Prevent, change or reduce undesired effects
- Achieve improvement

The following are an integral part of GAS philosophy providing goals to strive hard towards achieving it:

- Ensuring that the activities required by the specified quality system or contract are planned, implemented and controlled and their progress monitored.
- Communication requirements pertaining to the specific product, project or contract in all affected departments, subcontractors and customers, and resolving problems that arise at the interfaces between such groups.
- Reviewing the results of any audits conducted.
- Controlling corrective actions.
- The effective utilization and continuous improvement of resources in all project operations.
- Reduction of scrap, rework and customer complaints.
- Recognizing and demonstrating that the project will be completed on time ensuring the quality, safety and within budgets.

GAS shall plan and documented the project execution process of each phase such as Engineering Design, Procurement, Contraction, maintenance, pre-commissioning and Commissioning in accordance with the contract requirement.

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The planning shall address actions for risks and opportunities. These actions shall be integrated and implemented into the Quality Management system & the effectiveness shall be evaluated.
While addressing actions on risks options like avoiding risks, taking or retaining risks with informed decision to pursue opportunity, eliminating source of risk, changing the likelihood or consequences or sharing the risk shall be considered.
While pursuing the opportunities options like adoption of new practices, Developing new Process, technology any other viable possibilities that can address organization or customer needs shall be considered.

Reference Procedure: GAS-QAP-RMP-015 Risk Management Procedure.

6.2 Project Quality Objectives and Planning

The project quality objectives for the intend project are to ensure that GAS scope is planned and performed in such a manner that it is safe and free from deficiencies, undertaken correctly to ensure cost effective and efficient completion, in accordance with contractual and regulatory requirements.

The quality records maintained by the QA/QC team shall confirm objective evidence of the required quality in accordance with contract and regulatory requirements. The quality records shall be subjected to audit and reviewed by the assigned Project QA/QC Lead and/or customer's representative.

Project Management Main objectives of GAS are:

- Weekly projected project quality index.
- Final inspection acceptance rate.
- Quality of supplied material.
- Customer and Contractor's NCR analysis summary report.
- Response time of LBE's (if any).
- NDT backlog and RTFI disagreements.
- Ensure that construction is accurately planned and organized.
- Ensure that all personnel involved in the activities are adequately trained and qualified and that each task and responsibilities have been correctly assigned.
- Ensure that procedures and instructions are issued for the performance of all activities that bear an effect on project quality.
- Ensure, by qualified inspection, that the work is carried out to the required quality level.

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6.3 Planning of Changes

When GAS determines the need for changes to the quality management system, the changes are carried out in a planned manner (see 4.4).

GAS considers:

- The purpose of the changes and their potential consequences.
- The integrity of the quality management system.
- The availability of resources; and
- The allocation or reallocation of responsibilities and authorities

Reference Procedure: GAS-QAP-PC-005 Project Proposal, Control, Planning & Execution.

7. Support

7.1 Resources

7.1.1 General

GAS Management ensures that, the requirement for resources is determined during the quality planning. Top management shall ensure that the resources needed to implementation & maintain of processes of the quality management system, execution of Project are identified and available in timely manner. As well as meet the customer's requirement to ensures the project execution in controlled manner.

GAS shall ensure that the quality resource requirements shall be in accordance with the project specific planning and contractual requirements.

7.1.2 People

GAS determines and provides the persons necessary for the effective implementation of its project quality management system and for the project execution and control of its processes as per project planning.

Refer Project Specific schedule and mobilization Plan.

7.1.3 Infrastructure

It is the responsibility of the Project Manager and Project Control Manager to identify, define, provide & maintain the appropriate work facilities that are required for the

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performance of activities, processes, and service that are ensure conformance to the specified requirements for project execution. Facilities shall include adequate work space, equipment, and all necessary support requirements.

Infrastructure shall be prepared such as;

- Identify building needs.
- Identify workspace needs.
- Identify hardware needs.
- Identify software needs.
- Identify utility needs.
- Identify equipment needs.
- Identify support services needs such as transport or communication.

Project Manager in coordination with Project Control Manager shall provide adequate temporary facility on Project.

7.1.4 Environment for the Operation of Processes

General Manager and Project Manager of Gas Arabian Services Co are responsible to ensure that the suitable working environment is identified to assigned personnel to achieve conformity of the service / product requirements.

GAS shall implement the **GAS Construction Safety Manual, Project specific Hazard Identification Plan** in order to provide safe working environment for the personnel's involved on the project activities.

- Project work conditions & environmental
- Protective equipment
- Work facility
- Work environmental (sanitation, cleaning, noise, vibration, lighting, temperature, humidity, etc).

Refer GAS Construction Safety Manual, Project safety Plan, Hazard identification Plan.

7.1.5 Monitoring and Measuring Resources

7.1.5.1 General

Gas Arabian Services Co. Ltd. has defined the monitoring and measurement of activities (inspection and testing activities) to verify that the specified requirements of the project Execution are met in accordance with the quality Plan and/or documented procedures at appropriate stages of the product realization processes.

GAS determines and provides the resources needed to ensure valid and reliable results when monitoring or measuring is used to verify the conformity of each activities of project execution and services to specific requirements. GAS ensures that the resources provided:

- Are suitable for the specific type of monitoring and measurement activities being undertaken;
- Are maintained to ensure their continuing fitness for their purpose.

GAS shall prepare and submit to Customer an Inspection and Test Plan (ITP) and/or obtained from the customers preapproved standard formats as appropriate that indicates the QC activities necessary to verify that the work has been carried out in compliance with the technical and quality requirements set out in the Contract.

The ITP shall be prepared and submitted to Customer for review and approval, as per contract requirement. The following is a brief description of each of the column headings of ITP.
*As defined in reference **appendices 11.6** list of Inspection testing plan "ITP".*

- Overhaul Description will briefly describe the procedure e.g. minor overhaul/major over haul
- Quality control requirements. Brief description of the inspection or test, that verifies compliance with specified requirements
  Advance Notification requirements, for Request for Inspection (RFI).
- Responsibilities - identifies the personnel responsible for each item.
- Applicable procedures. Identify the specific procedure used for this particular quality control activity.
- Acceptance Criteria will be the acceptance criteria specified in the Technical Specification for the QC activity undertaken. This can be a value or specific reference to International, Customer or Contractor standard.
- Verifying Document will be the document that is produced as objective evidence that the component or equipment or test has been inspected in accordance with and complies with the specified requirements (e.g. checklist, test report, etc)
- Review, Witness and Hold points – identify the responsibilities
  Percentage of tests to be done.

GAS retains appropriate documented information as evidence of fitness for purpose of the monitoring and measurement resources.

Refer GAS-QAP-QCI-014 Quality Inspection and Disposition of record. ***GAS-QAP-COR-002 Control of Record***

7.1.5.2 Measurement Traceability

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When measurement traceability is a requirement, or is considered by GAS to be an essential part of providing confidence in the validity of measurement results, measuring equipment are:

- Calibrated or verified, or both, at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards when no such standard exist, the basis used for calibration or verification is retained as documented information;
- Identified in order to determine their status.
- Safeguarded from adjustments, damage or deterioration that would invalidate the calibration status and subsequent measurement results.

7.1.6 Organizational Knowledge

GAS determines the knowledge necessary for the operation of its processes and to achieve conformity of production and services.

This knowledge is maintained and made available to the extent necessary. When addressing changing needs and trends, GAS considers its current knowledge and determines how to acquire or access any necessary additional knowledge and required updates.

Refer GAS-QAP-MAM-008 Monitoring and Measuring of Equipment. GAS-QAP-COR-002 Control of Record.

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7.2 Competence

GAS shall determine & maintain documented information to ensure that all personnel who manage, perform, or verify activities within QMS affecting conformity to production requirements are qualified and competent to establish minimum requirements for that function on the basis of appropriate education, training, skills, experience and other recognized criteria.

GAS determines the necessary competence for personnel performing activities affecting conformity to product requirements and provides training or similar actions to ensure and satisfy the required needs. Any actions taken to improve the competence and/or training are evaluated to ensure compliance.

The Documented procedure **GAS-QAP-TAQ-004 Staff training and Qualification** define in detail for the staff training, A formal site introductory training will be imparted to ensure that all staff receives the necessary training to supplement their existing expertise and experience to enable them to perform their duties as well as for their acquisition of quality consciousness.
Job proficiency obtained by experience shall be considered adequate for personnel carrying out quality related activities not requiring specialist knowledge or skills. New

personnel for such positions shall receive "on-the-job training" under the supervision of experienced personnel. Such training is designed to ensure a satisfactory skill progression for employees.

In addition to this all project personnel shall be given instructions covering project specific safety requirements, if any, and quality procedures based on the elements of the project quality plan that are relevant to the roles of personnel.

7.3 Awareness

QC Supervisor shall conduct weekly/as required basis, QA/QC Toolbox meetings for labor, craftsmen and foremen. This meeting shall cover Safety, quality procedures, ITP and the mandatory Customer inspection items for the construction activities that are about to commence or have just commenced.

Training and awareness programs shall be conducted to each personnel based on their specific activity and stipulate the planned training session per all the process related activity such as Welding, Coating, RTR installation, Cable splicing, lowering etc.

GAS shall ensure the project execution planning and the monthly manpower forecast shall be provided to the Customer

All personnel are made aware of the relevance and importance of their activities, quality Policy and their contribution to the achievement of the quality objectives, effectiveness of Quality Management system & benefits of improvement. Awareness on Implications of not conforming to the Quality management system shall also be provided. Documented information related to awareness shall be maintained.

7.4 Communication

Gas Arabian Services Co. Ltd. has an identified and established line of communication within the organization and Customer's relating to product / projects information, enquiries, contract or order handling; including amendments.

The line of communication is clearly defined in the referenced organization chart appendices 11.2.

However each Project Quality plan and associated Project Organization Chart clearly define the line of communication internally and externally.
The way of communication shall be conducting weekly meetings for each phase of project activities "engineering, procurement and construction" include but not limited to, the responsible personnel for evaluation of client feedback/complaints and responding to them.

Method of communication shall be followed as appropriate:

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- Conducting weekly meetings and generate minutes of meeting.
- Formal draft letters.
- E-mails
- Any other appropriate method of communication.

7.5 Documented Information

7.5.1 General

The GAS Arabian Services operates and maintains a documented Quality System which defines the policies, objectives, responsibilities, delegation of authority and methodology applied to all quality related activities within the organization The project quality plan documentation is structured in the order of precedence.

Documentation Requirements.

The Quality Management System is documented to an extent necessary, to meet the requirements and Quality Standard. The documents related to Quality Management System are defined levels as listed below:

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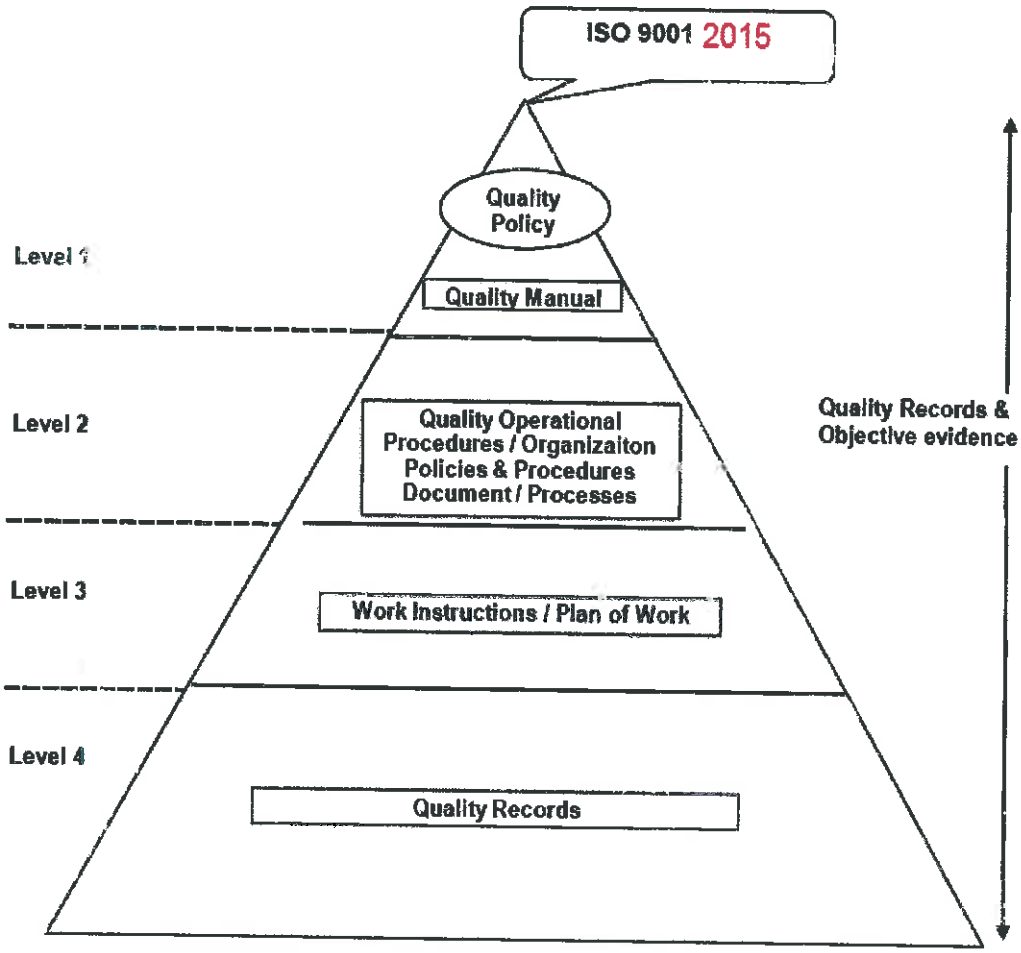
Structure of Quality Management System Documentation.



The Quality Policy of GAS clearly states the commitment of its Management to comply with the Quality Management System. It is communicated and understood within the organization at all levels. Quality Objectives are established within the framework provided by the Policy at relevant functions. The Objectives are measurable and are reviewed at defined intervals.

The Quality Manual / Project Specific Quality Plan, being the first level document, gives the scope and overview of the Quality Management System, makes reference to the documented procedures within the Standard and provides the description of the interaction between the processes of the Quality Management System.

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Project Quality Plan: Project Quality Plan (PQP) which states the overall quality management systems specific to the project - ISO 9001:2015, Documented Procedures and in which the project quality policy has been published.

PQP is supported by a comprehensive series of Documented Procedures "QAP" that define in detail, the standard approach that shall be adopted.

Wherever necessary, project specific procedures shall be prepared to supplement or otherwise develop and define operational and quality activities contained in the existing Quality Assurance Procedures "QAP".

Inspection and Test Plan also is a part of PQP. This is to define the inspection frequency, acceptance criteria, verifying document, etc. for various activities. Mandatory Customers presence to witness will be indicated here. Individual Inspection and Test Plans shall be developed for each discipline of work as per project requirement.

The Project QA and QC Manger or his designate in consultation with the Project Manager shall review and update the PQP, as necessary, to ensure that in line with the scope of work. Any such modifications shall be agreed by Project Manager and approved by the General Manager prior to submission for Customer's approval.

Quality Assurance procedures: Quality Assurance Procedures describes the responsibilities and methods to be followed for carrying out various activities and task in sufficient detail. These procedures define how the requirements of applicable clauses of ISO 9001:2015 are applied to the services. These Procedures shall be distributed to all concerned persons.

Quality Control Procedures/Work Instructions: Quality control procedures are defined to execute the work, meeting all quality requirements of QMS. The preparation and control of above-mentioned documents are included in Quality Assurance Procedures and/or project requirements as appropriate.

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Quality System Manual

The purpose of the Quality System Manual is to provide a framework of how policies are discerned by the Management and how the requirements of the Quality Management System are to be achieved and supported within the overall quality management system. It is also for the purpose of defining how these policies are translated into a working system that can be maintained, reviewed and constantly improved. This manual clearly gives the interaction between processes.

The Quality System Manual is reviewed, authorized and approved for its application by the Quality Management Representative (Quality Manager) and under guidance of Top

Management. Controlled copies of the manual are issued to those persons identified in the Distribution Log and a register of holders is maintained. The Quality Manager is responsible to ensure that the contents of this manual are understandable to all employees of the Company.

7.5.2 Creating and Updating.

When creating an updating documented information, GAS ensures appropriate:

- Identification and description (e.g. title, date, or reference number and revision);
- Format (e.g. Template, language, software version) and media (e.g. paper, electronic)
- Review and approval for suitability and adequacy

7.5.3 Control of Documented Information

Gas Arabian Services Co. Ltd. has established maintained documented procedure ***GAS-QAP-DDC-001 Document and Data Control*** for control of all documentation relating to the Quality Management System. All essential documents affecting quality shall be reviewed for adequacy and approved for release by Management Representative.

The procedure facilitates to locate records and control issuance of forms and procedures. The availability of Quality System Operating Procedures and cancellation and withdrawal of superseded documents are identified through this procedure.

The procedure defines adequacy of documents prior to issue. It reflects the status of the changes and current revision of documents identified as well as relevant versions available at points of use. The procedure also defines how external origin documents which are determined by the organization to be necessary for planning and operations of the Quality Management System are identified and how its distribution is controlled. It prevents the unintended use of obsolete documents.

Reference Procedure: GAS-QAP-DDC-001 Document & Data Control

Control of Record:

The Company has established and maintained a documented procedure ***GAS-QAP-COR-002 Control of Record*** for identification, collection, indexing, filing, and maintenance of Quality Records to ensure effective operation of the Quality System and to demonstrate conformance to specific requirements.

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The established system procedure ensures that Quality Records are generated, identified, filed, and maintained in accordance with relevant established system. The Quality Records are legible, easily retrievable and maintained in a way to prevent damage, deterioration or loss.

The established system defines the responsibility of different company departments and staff members towards the safeguarding of the records. It also defines the retention period of records.

The procedure addresses the control of electronic data fed to the computer. The backup of this data is produced and all backup operations are monitored and recorded. Safety and security aspects of backup data operations are defined in the procedure.

Reference Procedure: ***GAS-QAP-COR-002 Control of Record***

8. Operation

8.1 Operational Planning and Control

GAS planned, implemented and controls the processes (see 4.4) needed to meet the requirements for the provision of production and services, and implemented the actions determined in Clause 6, by:

- Determining the requirements for the production and services;
- Establishing criteria for:
  - The processes;
  - The acceptance of production and services;
- Determining the resources needed to achieve conformity to the production and service requirements;
- Implementing control of the processes in accordance with the criteria; and e) Determining and keeping documented information to the extent necessary:
  - To have confidence that the processes have been carried out as planned;
  - To demonstrate the conformity of production and services to their requirements.

The output of this planning is in a form suitable to GAS method of operations. GAS ensures that outsourced processes are controlled (See 8.4).

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8.2 Requirements for Production and Services

8.2.1 Customer Communication

Gas Arabian Services Co. Ltd. has an identified and established line of communication with the Customer's relating to projects information, enquiries, contract or order including amendments.

The line of communication with customer is clearly defined in the referenced **project organization chart and QA/QC organization chart** enclosed in appendices **11.2 and 11.3.**

The way of communication shall be conducting weekly meetings for each phase of project activities "engineering, procurement and construction" include but not limited to, the responsible personnel for evaluation of feedback/complaints and responding to them.

Method of communication shall be followed as appropriate:

- Conducting weekly meetings and generate minutes of meeting.
- Formal draft letters.
- E-mails
- Any other appropriate method of communication.

8.2.2 Determination of Requirements Related to Products and Services.

When determining the requirements for the products and services to be offered to customers, GAS ensures that:

- The requirements for the products and services are defined, including:
  - any applicable statutory and regulatory requirements.
  - those considered necessary by the organization.
- GAS can meet the claims for the products and services it offers

GAS Project Manager in Coordination with Project Control department shall review the contract agreement to determine the customers requirement.

GAS Arabian Services Co. Ltd. establishes the product/ services requirements which are specified by the Customer during the review of requirements related to the product, including the requirement for delivery and/or post-delivery activities, as applicable. **GAS-QAP-PC-005 Project Proposal, Project Control, Project Planning & Execution. Refer 11.3 List of QCP procedures and 11.6 Inspection and Testing Plan.**

8.2.3 Review of Requirements Related to Products and Services

GAS Arabian Services ensures that it has the ability to meet the requirements for products and services to be offered to customers. GAS will conduct

- review before committing to supply products and services to a customer, to include:
- Requirements specified by the customer, including the requirements for delivery and post-delivery activities.
- Requirements not stated by the customer, but necessary for the specified or intended use, when known.
- Requirements specified by the organization.
- Statutory and regulatory requirements applicable to the products and services.
- Contract or order requirements differing from those previously expressed.
- Process Bid or no Bid, ***GAS-QAP-PC-005* Project Proposal, Project Control, Project Planning & Execution** detailed the required procedure to review the requirement for the products and services.

GAS ensures that contract or order requirements differing from those previously defined are resolved. The customer's requirements shall be confirmed by GAS before acceptance, when the customer does not provide a documented statement of their requirements.

GAS retains documented information, as applicable:

- On the results of the review.
- On any new requirements for the products and services.

8.2.4 Changes to Requirements for Products and Services

GAS ensures that relevant documented information is amended, and that relevant persons are made aware of the changed requirements, when the requirements for products and services are changed.

8.3 Design and Development of Products and Services

8.3.1 General

GAS's Quality Management System shall ensure that design and development is a controlled function. The Documented Procedure ***GAS-QAP-EG-006 Engineering Procedure*** and ***GAS-QAP-PRO-007 Procurement Procedure*** established and implemented that assures activities are performed effectively and efficiently in accordance with customer's standard requirement.

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8.3.2 Design and Development Planning.

GAS Engineering team ensures that design decisions shall be made in accordance with Customers standard requirement, as required authorized qualified agencies service shall be obtain that are in possession of or have access to the pertinent design criteria, contractual requirements, codes, regulations, standards and guidelines. Such out sourced services shall be fully controlled by GAS as per project specific requirement and Quality Plan.

8.3.3 Design Inputs

In many cases definition of design input is a contractual matter, but GAS Arabian Services confirms that design input data provided is consistent and sufficient, when considered with relevant statutory and regulatory requirements, to provide a suitable basis for the design and its verification.

Conflicting, ambiguous and incomplete requirements are resolved with the data provider.

8.3.4 Design and Development Controls

Design documents and the design concepts and requirements expressed therein, are subjected to review and approval by qualified personnel, other than those who did the original design, with clearly designated responsibility and authority to do so, prior to release for purchasing, fabrication or construction. Design approvals will be taken from the customer through Reviews and comment resolutions.

Design approvals are based on one or more of the following:

- Evidence of related experience
- Independent review of analysis and calculations involved in design concepts and decisions
- Other appropriate and adequate objective evidence that the design criteria and documentation requirements have been satisfied.

Design documents shall identify those items of the design that are crucial to its safe and proper functioning and specify the quality standards to which these items shall be produced. Deletions, additions and changes to design documents, subsequent to approval for release shall be identified and documented.

Deviations from the requirements of design and contract documents, including designated quality standards, shall be subject to the same authorizations as the requirements involved.
Incomplete, ambiguous, or conflicting requirements shall be resolved by those responsible for generation and approval of the requirements. In order to control and

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verify the design of products to meet the criteria as cited above, GAS shall implement and operate design controls such as:

- Effective design and development planning
- Design and Development inputs
- Design and Development outputs
- Design Reviews
- Design verification and validation
- Control of Design changes

The design control activities described above are carried out in accordance with procedures reference in the specific Project Quality Plan and Contractual requirements.

8.3.5 Design and development Output

In some projects, the design output from one phase becomes the design input to subsequent phases.

The format of design output, or deliverable, documents should facilitate verification that they meet design input requirements; include reference/acceptance criteria where applicable; provide appropriate information for subsequent activities in procurement, construction and installation phases; and identify design characteristics that are crucial to safe and proper function of the product.

Design output documents are reviewed, checked and approved by authorized persons prior to issue.

8.3.6 Design and Development Changes

GAS ensures for any changes made during, or subsequent to, the design and development of products and services, GAS Engineering team to identify, review and control the changes to the extent necessary to ensure that there is no adverse impact on conformity to requirements.

Documented information is also required to be retained on the following:

- Design and development changes,
- The results of reviews,

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- Authorization for the changes,
- Actions taken to prevent adverse impacts due to the changes.

8.4 Control of Externally Provided Processes, Products, and Services

8.4.1 General

GAS ensures that externally provided processes, production and services conform to requirements.

GAS determines the control applied to externally provided processes, production, and services when:

- Production and services from external providers are intended for incorporation into GAS own production and services;
- Production and services are provided directly to the customer(s) by external providers on behalf of GAS and A process, or part of a process, is provided by an external provider as a result of a decision by GAS.

GAS determines and applies criteria for the evaluation, selection, monitoring of performance, and re-evaluation of external providers, based on their ability to provide processes or production and services in accordance with requirements. GAS retains documented information of these activities and any necessary actions arising from the evaluations.

Reference: GAS-QAP-PRO-007 Procurement Procedure, GAS-QAP-EG-006 Engineering Procedure, GAS-QAP-CCS Coordination and Control of Sub-contractor.

8.4.2 Type of Extent Control

GAS ensures that externally provided processes, production and services do not adversely affect GAS ability to consistently deliver conforming products and services to its customers.

- Ensures that externally provided processes remain within the control of its quality management system.
- Defines both the controls that it intends to apply to an external provider and those it intends to apply to the resulting output.
- Takes into consideration:

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1. The potential impact of the externally provided processes, production and services on GAS ability to consistently meet customer and applicable statutory and regulatory requirements.

2. The effectiveness of the controls applied by the external provider.

- Determines the verification, or other activities, necessary to ensure that the externally provided processes, production and services meet requirements.

8.4.3 Information for External Providers

GAS ensures the adequacy of requirements prior to their communication to the external provider. GAS communicates to external providers its requirements for:

- The processes, products and services to be provided.
- The approval of: Production and services, Methods, processes and equipment.
- The release of production and services, Competence, including any required qualification of persons.
- The external providers' interactions with GAS Control and monitoring of the external providers' performance to be applied by GAS and Verification or validation activities that GAS or its customer, intends to perform at the external providers' premises.

Reference GAS-QAP-CNP-011 Control of Non Conforming Product and Services, GAS-QAP-CCS-013 Coordination and Control of Sub-Contractor and Services.

8.5 Production and Service Provision

8.5.1 Control of Production and Service Provision

GAS has established the following control applicable to construction and project management activities. These activities are reflected in detail as per Client's applicable standards and form part of this quality plan.

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- Activities are planned
- Acceptance criteria defined
- Applicable Special Processes Procedures, method statement, work instructions are available to the workforce
- Applicable code, standards, specifications are available to the workforce.
- A program to monitor the effectiveness of these process controls is in place & implemented.

8.5.2 Identification and Traceability

GAS ensures and established the system that maintains:

Identification of the (Equipment, Materials, Parts and Components) will be ensured by marking in accordance with the purchase specification, codes and standards. The same is achieved by using tags, stamps, color coding, stencils or labels or by records traceable to an item throughout fabrication, erection, installation, repair, modification, and use of the item.

All materials and product shall be positively identified throughout the construction products. Traceability will be maintained for equipment, material parts and components as specified in Clients applicable Standards and manufactures specifications.

Where contractually specified, or subject to an assessment of the risk involved, controlled will be established to provide for the traceability of materials or products, to the sources of supply.

GAS Traceability requirements shall be kept to the minimum consistent with the safe and efficient operation of the installation concerned, and shall only be applied when failure of the equipment or material could result in a hazard to persons or the environment, or a significant loss of production output.

GAS has established the documented procedure "***GAS-QAP-PRO-007 Procurement Procedure" "GAS-QAP-MHS-009 material handling storage preservation and delivery***" to provide the guideline for the material identification and traceability.

8.5.3 Property Belonging to Customers or External Providers

The company shall maintain separate inventory and protection of the raw/semi-finished products received for further processing, if contracted.

The company shall utilize the said material only as per instructions received from the client directly and dispose-off the extra/unused material **as per client's instructions.**

The company shall prepare any NCR on the material and dispose it off as per client's instructions.

8.5.4 Preservation

A system shall be maintained for the handling, storage and shipping, including cleaning, packing and preservation of all items through the entire manufacturing and construction process. Precautions shall be taken to protect material from abuse, misuse, damage, deterioration and unauthorized use in accordance with the referenced procedure.

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Reference GAS-QAP-MHS-009 Handling, Storage, Packaging Preservation and Delivery.

8.5.5 Post-delivery Activities

The Top Management ensures that customer requirements are determined and are met with the aim of enhancing customer satisfaction.

The organization determine the requirements specified by the customer including delivery & post delivery that includes action under warranty provisions, contractual obligations, through regular interactions, Minutes of Meetings, Correspondence & as required customer satisfaction survey.

As one of the measurements of the performance of the Quality Management System, the organization has established to monitor information relating to customer perception as whether the organization has met customer requirements.

The Specific Methods to monitor the customer satisfaction are:

Input source such as:

Weekly Progress minutes of meeting.

Project Quality Index

Project Safety Index

Official Communication Letters (incoming and Out Going)

Project Completion Certificates / Customer satisfaction survey as applicable.

Customer comments on delivered product quality.

Various data source recorded during the course of project execution such as

Master NCR's Log, log book entries, internal NCR's etc.

8.5.6 Control of Changes

GAS reviews and controls changes for production or service provision, to the extent necessary to ensure continuing conformity with requirements. GAS retains documented information describing the results of the review of changes, the person(s) authorizing the change, and any necessary actions arising from the review.

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8.6 Release of Production and Service.

GAS has implemented planned arrangements, at appropriate stages, to verify that the production and service requirements have been met. The release of products and services to the customer, do not proceed until the planned arrangements have been satisfactorily completed, unless otherwise approved by a relevant authority and, as

applicable, by the customer. GAS retains documented information on the release of products and services. The documented information includes:

- Evidence of conformity with the acceptance criteria.
- Traceability to the person(s) authorizing the release.

8.7 Control of Non-Conforming Outputs

GAS Arabian services have developed the documented procedure GASQAP-CNP-011 to control of non-conforming product for the entire project includes Engineering, procurement, construction and pre-commissioning.

The QA and QC Manager shall control the known nonconformance's, the nonconformance's can be describe items, material or services which do not meet the specified standard requirement.

All non-conformities shall be reported to QA and QC manager and shall be identified by marking, tagging or physical segregation where practicable from the work to prevent their inadvertent use or installation. No further processing or delivery of such product shall be carried out until the non-conformance is removed or adequately dis-positioned.

An applicable Non-Conformance Report (NCR) shall be completed identifying the product, deviation or discrepancy forwarded to quality assurance for review at which point the product is classified as follows:

- Rework/Repair
- Reject or scrap

GAS shall submit a copy of each NCR to Customer within 48 hours. Quality personnel responsible for disposition non-conformities shall ascertain that the deviation or discrepancy is clearly described relative to the acceptance criteria.

Where for reasons of urgent production purpose continuation of processing is deemed necessary, GAS shall have the authority to release the material, provided that it shall be positively identified and recorded in order to permit immediate recall in the event of a reject disposition.

Decision on GAS non-conforming product shall be subject to approval by Customer.

GAS shall maintain objective evidence to substantiate that repaired or reworked products have been re-inspected or re-tested according to applicable procedures.

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Reference Procedure: GAS-QAP-CNP-011: Control of Nonconforming product

9. Performance Evaluation

9.1 Monitoring, Measurement, Analysis and Evaluation

9.1.1 General

GAS determines shall establish a documented procedure ***GAS-QAP-QCI-014 Quality Control Inspection and Dispositions*** to plan and implement the monitoring, measurement, analysis and evaluate processes needed to demonstrate conformity to product requirements, ensure conformity of the Quality Management System, and continually evaluate the effectiveness of the Quality Management System. This shall include determination of applicable methods & when the monitoring and measurement shall be performed & when it shall be analyzed and evaluated.

Reference: ***GAS-QAP-QCI-014 Quality Control Inspection and Dispositions***

9.1.2 Customer Satisfaction

At least once every six months the management shall conduct a customer satisfaction survey in order to obtain input feedback from the customer regarding GAS achievement to meet the customer requirement.

9.1.3 Analysis and Evaluation

GAS analyzes and evaluates appropriate data and information arising from monitoring and measurement. The results of analysis are used to evaluate:

- Conformity of products and services.
- The degree of customer satisfaction.
- The performance and effectiveness of the quality management system.
- If planning has been implemented effectively.
- The effectiveness of actions taken to address risks and opportunities.
- The performance of external providers; and
- The need for improvements to the quality management system.

Reference: ***GAS-QAP-QCI-014 Quality Control Inspection and Dispositions, GAS-QAP-MAM-008 Monitoring and Measuring of Equipment. GAS-QAP-CCS-013 Control and Coordination of Sub-contractor.***

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9.2 Internal Audit

To ensure that the Management System is efficient, effective and fully implemented, the company operates a comprehensive internal audit program. Audits are planned on the basis of the importance and potential risk of the activities to be audited and are performed by auditors who are independent of responsibility for the activities being audited. The audit frequency criterion is defined in the Procedure and GAS Internal Audit Schedule. Audit results are documented and brought to the attention of the person responsible for the area being audited.

The Document controller or QA Engineer under the supervision of the Quality Manager shall be responsible for scheduling auditing programs and effective implementation of audits. Non-conformities raised during audits are recorded and an audit report is prepared. The results of audits are communicated to respective managers who are responsible for timely implementation of agreed corrective and preventive actions.

If required, besides the planned auditing, at the discretion of GAS top Management or Quality Manager, random auditing can be conducted.

Records of such auditing shall be maintained.

Follow-up audit to verify the implementation of previous audit results shall be conducted as appropriate and necessary. Reports of all kinds of audit shall be submitted to the Management and reviewed during management review meetings.

When and where required project specific audit shall be planned and carried out as per contract and customer's requirement.

Audits shall be performed in accordance with documented procedures and checklists that identify essential characteristics.

Reference Procedure: **GAS-QAP-IQA-010 Internal Quality Audit**

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9.3 Management Review

9.3.1 General

Quality Management System of GAS PMT is designed following the philosophy of **PLAN – DO – CHECK – ACT**. To support the basic theme of the Quality Management System, Management Review Meetings are arranged at approximately six months intervals. These meetings ensure that the systems developed are effective and provide continuing suitability throughout the changing circumstances.

These management reviews are additional to the findings of internal audits conducted to ensure continued adherence to the system.

During Management Review Meetings the attendees review the results of different system practices and monitor the implementation of corrective and preventive actions. M.R. meetings are used to assess opportunities to improve Quality Management System and to enhance customer satisfaction. The Quality Manager maintains the record of each Management Review Meeting. It is the prime duty of all the participants to submit their inputs to the Quality Manager prior to the Management Review Meeting, so that he could communicate these inputs to other participants for discussion during the meeting

9.3.2 Management Review Inputs

The Management Review In put shall include but not limited to:

- Follow-up actions from earlier management review
- Process performance and product conformity
- Ensure that management quality policy objectives, assignments, Delegations and methods are achieving the required results
- Reveal defects or irregularities in any of the elements examined
- Indicate possible improvements
- Check on the effectiveness of Management at all levels
- Uncover potential danger spots to eliminate waste or loss
- Examine the complaints received from customers/end users
- Verify that corrective action procedures are effective.

The review output is the result of documented Management review meeting:

- Generate action to improve the quality system.
- Generate action to improve the processes and performance
- Generate action ensure the resource needs

Other than the outputs, it is the responsibility of the Document Controller /or QMR to maintain the following records of each Management Review Meeting:

- Notification of Management Review Meeting
- Agenda of the meeting

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- Inputs of the meeting
- Attendance record of the meeting
- Minutes of the meeting
- Outputs / Action Plan of the meeting
- Corrective & Preventive Actions Request as a result of the meeting

9.3.3 Management Review Outputs

The review output is the result of documented Management review meeting:

- Generate action to improve the quality system.
- Generate action to improve the processes and performance
- Generate action ensure the resource needs

GAS shall ensure that Senior Management Reviews are scheduled event included in the quality audit schedule approved by General Manager and / or Customer Representative in accordance with the contractual requirement.

Where applicable on Project specific GAS shall inform the Customer Representative in writing of the results and recommended actions of Management reviews within two (2) weeks after the scheduled review date. Changes to the quality system that result from Management reviews shall be incorporated in the project quality plans as required, with the approval of Customer Representative.

Reference Procedure: GAS-QAP-MR-003 Management Review

10. Improvement

10.1 General

The use of statistical methods by GAS is beneficial to assist in making best use of GAS requirements and expectations, in process control, in defect avoidance, in problem analysis, in finding root causes, process limits, forecasting, verification, measurement or assessment of quality.

The real effectiveness of the Quality Management System lies in gradual process improvement in the system, with changing conditions. The system is based on **PLAN – DO – CHECK – ACTION** philosophy. That is why the effectiveness of every action is checked which ultimately give direction to more improvement.

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GAS Arabian services have developed the documented procedure **GAS-QAP-CNP-011 to control of non conforming product** for the entire project includes Engineering, procurement, construction and pre-commissioning.

The QA and QC Manager shall control the known nonconformance's, the nonconformance's can be describe items, material or services which do not meet the specified standard requirement. All non-conformities shall be reported to QA and QC manager and shall be identified by marking, tagging or physical segregation where practicable from the work to prevent their inadvertent use or installation. No further processing or delivery of such product shall be carried out until the non-conformance is removed or adequately dis-positioned.

An applicable Non Conformance Report (NCR) shall be completed identifying the product, deviation or discrepancy forwarded to quality assurance for review at which point the product is classified as follows:

10.2 Non-conformity and Corrective Action

GAS Project QA and QC Manager shall maintain a system of on–going analysis on non- conformities in order to isolate sensitive areas and/or trends of deterioration. Conditions such as item/equipment malfunctions, deficiencies, deviations and non-conformance adverse to the achievement of quality requirements shall be identified and corrected. For significant conditions adverse to quality requirements, Project QA and QC Manager shall determine the cause of such conditions, obtain necessary corrective action from the responsible supervisor and ensure that appropriate action is taken to prevent repetition.

The identification of the significant conditions adverse to quality, the cause of the condition and the corrective actions taken shall be documented and reported to the appropriate Discipline Head.

Project QA and QC Manager shall continue to monitor processes and work operation and analysis or records to detect and eliminate potential causes of non-conforming product.

Reference Procedure: GAS-QAP-CPA-012: Corrective and Preventive Action

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10.3 Continual Improvement

Gas Arabian Services Co. Ltd. shall make use of the project quality plan, quality objectives, audit results, analysis of data, corrective and preventive action and management review to ensure continual improvement of the effectiveness of the quality management system.

11. Appendices

11.1 Project Organization Chart
11.2 QAQC Organization Chart
11.3 Tentative Internal Quality Audit
11.4 List of Quality Assurance procedures
11.5 List Quality Control Procedures
11.6 List Inspection Testing Plan/Checklist

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11.1 Project Organization Chart

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11.2 QAQC Organization Chart

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11.3 Tentative Internal Quality Audit

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11.4 List Quality Assurance Procedure

List of Quality Assurance Procedure			
S.NO	**Document NO**	**Title**	**Remarks**
1	GAS-QAP-DDC-001	Document and Data Control Procedure	
2	GAS-QAP-COR-002	Control of Record	
3	GAS-QAP-MR-003	Management Review	
4	GAS-QAP-TAQ-004	Staff Training and Qualification	
5	GAS-QAP-PC-005	Project Proposal, Project Control, Project Planning & Execution	
6	GAS-QAP-EG-006	Engineering	
7	GAS-QAP-PRO-007	Procurement Procedure	
8	GAS-QAP-MAM-008	Control of Monitoring & Measuring Equipment	
9	GAS-QAP-MHS-009	Handling storage, Packing, Preservation and Delivery.	
10	GAS-QAP-IQA-010	Internal Quality Audit	
11	GAS-QAP-CNP-011	Control of Nonconforming Products	
12	GAS-QAP-CPA-012	Corrective & Preventive Action	
13	GAS-QAP-CCS-013	Co-ordination and Control of Sub Contractor	
14	GAS-QAP-QCI-014	Quality Control Inspection and Disposition of reports	
15	GAS-QAP-RMP-015	Risk Management Plan	
16	GAS-QAP-FEC-016	Field Engineering Change	

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11.5 List of Quality Control Procedures

(All Special processes procedure shall submit for Customer's review and approval one-month prior execution of work)

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List of Quality Control Procedure

S.NO	Document NO	Title	Remarks
		Civil	
		Mechanical	
1	GAS-QCP-MECH-001	Mechanical pump/compressor/turbine overhauling	
		Electrical	
1	GAS-QCP-ELEC-002	Power Cable termination	
		Instrumentation	
1	GAS-QCP-INST-001	Installing Instrumentation	
2	GAS-QCP-INST-002	Instrument Calibration	
3	GAS-QCP-INST-003	Instrument Loop Checks	

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11.6 List of Inspection checklist

List of Inspection Testing Plan

S.NO	Document NO	Title	Remarks
		CIVIL	
		Mechanical	
1	GAS-Checklist -MECH-001	Mechanical Work Inspection checklist	
		Electrical & Instrumentation	
1	GAS-Checklist -ELE / INST-001	Electrical & Instrumentation Work Inspection checklist	

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QA/AC Checklist

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GAS ARABIAN SERVICES

QA / QC Department

INSPECTION REPORT

EXTRUDER OVERHAULING (BARREL AND SCREW)

EQUIPMENT TAG NO:		PLANT	HDPE	DATE	
1.0 Following requirements & involved hazards to be checked.		**YES**	**NO**	**Remarks**	
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.				
1.2	Take work permit and ensure equipment preparation for maintenance .				
1.3	Shall ensure proper lock out & tag out.				
1.4	All required PPE's to be ensured for their healthiness for use.				
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**	**NO**		
2.1	Technician must be qualified.				
2.2	Proper & safe access/approach is available for execution of overhauling job.				
2.3	Ensure all team members are aware of the SOW.				
2.4	Ensure all team members are using working gloves.				
2.5	Only one technician to rotate chain sprocket to prevent finger injury.				
3.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES	NO		
3.1	Decoupling between gearbox output shaft to screw				
3.2	Coupling gap between gearbox output shaft to screw				
3.3	Condition check for the coupling			Replace if required	
3.4	Condition check for the Visco seal			Replace if required	
3.5	Adjusting nut reference for startup valve				
3.6	Slider pin OD measurement			Activity shall be done after hydrojetting	
3.7	Start valve cylinder ID measurement			Activity shall be done after hydrojetting	
3.8	Inspection for the screw elements for wear and tear			Activity shall be done after hydrojetting	
3.9	Screw element OD measurement			Activity shall be done after hydrojetting	
4.0	NDT for screw shaft splines area			NOTE : This activity will be done if screw elements are unstack	
4.1	Cobra measurement for barrel performed by OEM				
4.2	Barrel gasket verification			NOTE : This activity will be done if barrel removed	
4.3	Torque tightening of barrel bolts			NOTE : This activity will be done if barrel removed	
4.4	Greasing of coupling done			Write the specification of the grease	

GAS QA / QC

Name		Signature		ID#		Date	

GAS PM APPROVAL

Name		Signature		ID#		Date	

S-CHEM APRROVAL

Accepted			REJECTED				
Name		Signature		ID#		Date	

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

S. Mukherjee

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GAS ARABIAN SERVICES

QA / QC Department

INSPECTION REPORT

EXTRUDER OVERHAULING (BARREL AND SCREW)

EQUIPMENT TAG NO:		PLANT	LLDPE	DATE	
1.0 Following requirements & involved hazards to be checked.		**YES**	**NO**		**Remarks**
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.				
1.2	Take work permit and ensure equipment preparation for maintenance .				
1.3	Shall ensure proper lock out & tag out.				
1.4	All required PPE's to be ensured for their healthiness for use.				
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**	**NO**		
2.1	Technician must be qualified.				
2.2	Proper & safe access/approach is available for execution of overhauling job.				
2.3	Ensure all team members are aware of the SOW.				
2.4	Ensure all team members are using working gloves.				
2.5	Only one technician to rotate chain sprocket to prevent finger injury.				
3.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES	NO		
3.1	Decoupling between gearbox output shaft to screw				
3.2	Coupling gap between gearbox output shaft to screw				
3.3	Condition check for the coupling				Replace if required
3.4	Condition check for the Visco seal				Replace if required
3.5	Adjusting nut reference for startup valve				
3.6	Slider pin OD measurement				Activity shall be done after hydrojetting
3.7	Start valve cylinder ID measurement				Activity shall be done after hydrojetting
3.8	Inspection for the screw elements for wear and tear				Activity shall be done after hydrojetting
3.9	Screw element OD measurement				Activity shall be done after hydrojetting
4.0	NDT for screw shaft splines area				NOTE : This activity will be done if screw elements are unstack
4.1	Cobra measurement for barrel performed by OEM				
4.2	Barrel gasket verification				NOTE : This activity will be done if barrel removed
4.3	Torque tightening of barrel bolts				NOTE : This activity will be done if barrel removed
4.4	Greasing of coupling done				Write the specification of the grease

GAS QA / QC

Name		Signature	ID#		Date	

GAS PM APPROVAL

Name		Signature	ID#		Date	

S-CHEM APRROVAL

Accepted		REJECTED				
Name		Signature		ID#		Date

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

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QA / QC Department

INSPECTION REPORT

EXTRUDER OVERHAULING (BARREL AND SCREW)

EQUIPMENT TAG NO:		PLANT	PP	DATE	
1.0 Following requirements & involved hazards to be checked.		**YES**		**NO**	**Remarks**
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.				
1.2	Take work permit and ensure equipment preparation for maintenance .				
1.3	Shall ensure proper lock out & tag out.				
1.4	All required PPE's to be ensured for their healthiness for use.				
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**		**NO**	
2.1	Technician must be qualified.				
2.2	Proper & safe access/approach is available for execution of overhauling job.				
2.3	Ensure all team members are aware of the SOW.				
2.4	Ensure all team members are using working gloves.				
2.5	Only one technician to rotate chain sprocket to prevent finger injury.				
3.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES		NO	
3.1	Decoupling between gearbox output shaft to screw				
3.2	Coupling gap between gearbox output shaft to screw				
3.3	Condition check for the coupling				Replace if required
3.4	Condition check for the Visco seal				Replace if required
3.5	Adjusting nut reference for startup valve				
3.6	Slider pin OD measurement				Activity shall be done after hydrojetting
3.7	Start valve cylinder ID measurement				Activity shall be done after hydrojetting
3.8	Inspection for the screw elements for wear and tear				Activity shall be done after hydrojetting
3.9	Screw element OD measurement				Activity shall be done after hydrojetting
4.0	NDT for screw shaft splines area				NOTE : This activity will be done if screw elements are unstack
4.1	Cobra measurement for barrel performed by OEM				
4.2	Barrel gasket verification				NOTE : This activity will be done if barrel removed
4.3	Torque tightening of barrel bolts				NOTE : This activity will be done if barrel removed
4.4	Greasing of coupling done				Write the specification of the grease

GAS QA / QC

Name		Signature		ID#		Date	

GAS PM APPROVAL

Name		Signature		ID#		Date	

S-CHEM APRROVAL

Accepted			REJECTED				
Name		Signature		ID#		Date	

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

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SMP & CHECKLIST

TITLE	SMP/CHECK LIST (EXTRUSION GEARBOX EXTD - UNIT 43, ZSK 380) MACHINE NO: 20507540	DATE	
		PLANT	LLDPE
		EQUIP. NO.	

1.0 Following requirements & involved hazards to be checked.		YES	NO	REMARKS
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.			
1.2	Work permit must be taken and equip. preparation for maintenance must be ensured.			
1.3	Shall ensure proper lock out & tag out.			
1.4	All required PPE's to be ensured for their healthiness for use.			
1.5	All covid 19 precaution must be taken before execution			
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**	**NO**	
2.1	Technician must be qualified.			
2.2	Proper & safe access/approach is available for execution of PM Job.			
2.3	Ensure all team members are aware of the SOW.			
2.4	Ensure all team members are using working gloves.			
3.0 Checklist& Procedure (Shutdown activity)		**YES**	**NO**	
3.6	Hot alignment will be checked and recorded after temperature reaches <60 degree alignment protocol for reference. Readings:			
3.7	Motor to input shaft coupling match marked done and coupling bolts removed			
3.8	Friction assembly marked and removed			
3.9	Coupling removed after taking initial and final travelling point [Total travelling limit ____ (min) to ____(max)] at Gearbox shaft coupling **(Hold Point)**			
310	Stub bolts of the bearing housing to gearbox casing taken as reference point, protuding length measured			
3.14	Top casing lifted horizontally by use of EOT & chain block and shifted in flipped condition			
3.15	Pinion shaft marked			
3.16	As found backlash checked and recorded b/w shaft #01 & shaft #05			
3.16	As found backlash checked and recorded b/w shaft #05 & shaft #02			
3.16	As found backlash checked and recorded b/w shaft #02 & shaft #03			
3.16	As found backlash checked and recorded b/w shaft #03 & shaft #04			
3.18	As found axial play measured & recorded for shaft #01 & #05			
3.19	Bearing clearance checked and recorded for bearing shaft #01 & #05			
320	Distance from housing flange to bearing bushing measured & recorded			
3.21	Input shaft assembly removed & shifted to the workshop			
3.22	Pinion shaft #05 hooked up and shifted to the workshop			
3.23	Saddle crack checked Note: Are there any shaddle Crack found **(Hold Point)**			
3.24	If saddle crack found, torsional shaft top casing removed & inspected			

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3.25	Recommended by S-CHEM AED torsional shaft removed after taking measurements (backlash for both output shafts #02, #03 & #04 bearing clearance. Please provide backlash limits					
3.26	Torsional shaft assembly removed and shifted to the workshop for bearing replacement recommended by S-CHEM AED					
3.27	Final Machining performed for Pre-fabricate PROSETIC Part & Upper saddle Part of Shaft No#02 and inspected					
3.28	All the bearings removed by pullers/heating torch/gas cutting for shaft #01 & #05.					
3.29	Measured & recorded input shaft #01 outside diameter for bearing positions after bearings removed **(Hold point)**	1				
		2				
		3				
		4				
330	Measured & recorded intermediate shaft #05 outside diameter for bearing positions after bearings removed **(Hold point)**	1				
		2				
3.31	Measured & recorded torsional shaft #04 outside diameter for bearing positions after bearings removed **(Hold point)**	1				
		2				
		3				
		4				
3.32	DPT performed for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.33	FLORSCENT TEST performed for the gear teeth for shaft no. #04, shaft no. #01 & shaft no. #05. **(Hold point)**					
3.34	OD checked and recorded for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.35	New bearings inner diameter checked & recorded for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.36	Inspected the new bearing & bearing position of shaft before installation **(Hold point)**					
3.37	New bearing heated in oven up to 120 degree and installed at shaft position for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.38	Casing cleaned and inspected					
3.39	Lube oil nozzles and orifice cleaned					
340	Torsional shaft no #04 assembly installed at position and inspected					
3.41	Pinion shaft no. #05 assembly installed at position and inspected					
3.42	Input shaft assembly #01 installed at position and inspected					
3.43	As left backlashchecked & recorded between input shaft#01 & pinion shaft#05.					
3.44	As left Backlash checked & recorded between pinion shaft#02 & #04 & helical pinion shaft#03 & #04. and it will be verified by GAS.					
3.45	As axial play will be measure and record for shaft #01 & #05 and it will be verified by GAS					
3.46	All the bearing clearences measured and recorded and it will be verified by gas.					
3.47	Top casing cleaned & installed at position, tapered pin and bolts installed					
3.48	Torquing done as per specified value					
3.49	Stub bolts of the bearing housing cover to the gear box casing bolts torqued as per specified torque value.					
350	DESCH coupling installed at location & travel range is (17 mm to 21mm) and friction assembly installed.(Note: Desch coupling hub is tapered fit)					
3.51	Friction assembly will be installed at marked position					
3.52	As left alignment checked and recorded between main motor and gearbox. R alignment protocol for reference **(Hold Point)** Readings:					
3.53	Gearbox output shafts spline coupling removed.					
3.54	Grease removed from the splines and gear as required					
3.55	New grease applied after inspection					
3.56	All lube oil lines installed with new gaskets.					
3.57	Flange Integrity done before gasket installation by S-CHEM					

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SMP & CHECKLIST

TITLE	SMP/CHECK LIST (EXTRUSION GEARBOX EXTD - UNIT 42, ZSK 380) MACHINE NO: 20507503	DATE	
		PLANT	HDPE
		EQUIP. NO.	

	1.0 Following requirements & involved hazards to be checked.	YES	NO	REMARKS
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.			
1.2	Work permit must be taken and equip. preparation for maintenance must be ensured.			
1.3	Shall ensure proper lock out & tag out.			
1.4	All required PPE's to be ensured for their healthiness for use.			
1.5	All covid 19 precaution must be taken before execution			
	2.0 Following minimum requirement to be complied and insured before executing the work.	**YES**	**NO**	
2.1	Technician must be qualified.			
2.2	Proper & safe access/approach is available for execution of PM job.			
2.3	Ensure all team members are aware of the SOW.			
2.4	Ensure all team members are using working gloves.			
	3.0 Checklist& Procedure (Shutdown activity)	**YES**	**NO**	
3.6	Hot alignment will be checked and recorded after temperature reaches <60 degree alignment protocol for reference.			
3.7	Motor to input shaft coupling match marked done and coupling bolts removed			
3.8	Friction assembly marked and removed			
3.9	Coupling removed after taking initial and final travelling point [Total travelling limit ____ (min) to ____(max)] at Gearbox shaft coupling **(Hold Point)**			
310	Stub bolts of the bearing housing to gearbox casing taken as reference point, protuding length measured			
3.14	Top casing lifted horizontally by use of EOT & chain block and shifted in flipped condition			
3.15	Pinion shaft marked			
3.16	As found backlash checked and recorded b/w shaft #01 & shaft #05			
3.16	As found backlash checked and recorded b/w shaft #05 & shaft #02			
3.16	As found backlash checked and recorded b/w shaft #02 & shaft #03			
3.16	As found backlash checked and recorded b/w shaft #03 & shaft #04			
3.18	As found axial play measured & recorded for shaft #01 & #05			
3.19	Bearing clearance checked and recorded for bearing shaft #01 & #05			
320	Distance from housing flange to bearing bushing measured & recorded			
3.21	Input shaft assembly removed & shifted to the workshop			
3.22	Pinion shaft #05 hooked up and shifted to the workshop			
3.23	Saddle crack checked Note: Are there any shaddle Crack found **(Hold Point)**			
3.24	If saddle crack found, torsional shaft top casing removed & inspected			
3.25	Recommended by S-CHEM AED torsional shaft removed after taking measurements (backlash for both output shafts #02, #03 & #04 bearing clearance. Please provide backlash limits			
3.26	Torsional shaft assembly removed and shifted to the workshop for bearing replacement recommended by S-CHEM AED			
3.27	Final Machining performed for Pre-fabricate PROSETIC Part & Upper saddle Part of Shaft No#02 and inspected			
3.28	All the bearings removed by pullers/heating torch/gas cutting for shaft #01 & #05.			

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3.29	Measured & recorded input shaft #01 outside diameter for bearing positions after bearings removed **(Hold point)**	1				
		2				
		3				
		4				
330	Measured & recorded intermediate shaft #05 outside diameter for bearing positions after bearings removed **(Hold point)**	1				
		2				
3.31	Measured & recorded torsional shaft #04 outside diameter for bearing positions after bearings removed **(Hold point)**	1				
		2				
		3				
		4				
3.32	DPT performed for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.33	FLORSCENT TEST performed for the gear teeth for shaft no. #04, shaft no. #01 & shaft no. #05. **(Hold point)**					
3.34	OD checked and recorded for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.35	New bearings inner diameter checked & recorded for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.36	Inspected the new bearing & bearing position of shaft before installation **(Hold point)**					
3.37	New bearing heated in oven up to 120 degree and installed at shaft position for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.38	Casing cleaned and inspected					
3.39	Lube oil nozzles and orifice cleaned					
340	Torsional shaft no #04 assembly installed at position and inspected					
3.41	Pinion shaft no. #05 assembly installed at position and inspected					
3.42	Input shaft assembly #01 installed at position and inspected					
3.43	As left backlashchecked & recorded between input shaft#01 & pinion shaft#05.					
3.44	As left Backlash checked & recorded between pinion shaft#02 & #04 & helical pinion shaft#03 & #04. and it will be verified by GAS.					
3.45	As axial play will be measure and record for shaft #01 & #05 and it will be verified by GAS					
3.46	All the bearing clearences measured and recorded and it will be verified by gas.					
3.47	Top casing cleaned & installed at position, tapered pin and bolts installed					
3.48	Torquing done as per specified value					
3.49	Stub bolts of the bearing housing cover to the gear box casing bolts torqued as per specified torque value.					
350	DESCH coupling installed at location & travel range is (17 mm to 21mm) and friction assembly installed.(Note: Desch coupling hub is tapered fit)					
3.51	Friction assembly will be installed at marked position					
3.52	As left alignment checked and recorded between main motor and gearbox. R alignment protocol for					
3.53	Gearbox output shafts spline coupling removed.					
3.54	Grease removed from the splines and gear as required					
3.55	New grease applied after inspection					
3.56	All lube oil lines installed with new gaskets.					
3.57	Flange Integrity done before gasket installation by S-CHEM					
3.58	All instrument connection, probes, cable wire installed by GAS with S-CHEM instrument team					
3.59	Electrical connection of exhaust fan from the roof connected by GAS with S-CHEM electrical team					
360	Electrical oil heaters switched on as required					
3.61	Scaffolding removed by S-CHEM assigned scaffolding team					
3.62	Housekeeping done & permit closed					
3.62	Machine handed over to S-CHEM					

Equipment Tag No.			
Completion Date:			
Executer Name:		**Sign:**	
Client supervisor Name		**Sign:**	

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

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SMP & CHECKLIST

TITLE	SMP/CHECK LIST (EXTRUSION GEARBOX EXTD - UNIT 44, ZSK 350) MACHINE NO: 20507466	DATE	
		PLANT	PP
		EQUIP. NO.	

		YES	NO	REMARKS
1.0 Following requirements & involved hazards to be checked.				
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.			
1.2	Work permit must be taken and equip. preparation for maintenance must be ensured.			
1.3	Shall ensure proper lock out & tag out.			
1.4	All required PPE's to be ensured for their healthiness for use.			
1.5	All covid 19 precaution must be taken before execution			
2.0 Following minimum requirement to be complied and insured before executing the work.		YES	NO	
2.1	Technician must be qualified.			
2.2	Proper & safe access/approach is available for execution of PM job.			
2.3	Ensure all team members are aware of the SOW.			
2.4	Ensure all team members are using working gloves.			
3.0 Checklist& Procedure (Shutdown activity)		YES	NO	
3.6	Hot alignment will be checked and recorded after temperature reaches <60 degree alignment protocol for reference. Readings:			
3.7	Motor to input shaft coupling match marked done and coupling bolts removed			
3.8	Friction assembly marked and removed			
3.9	Coupling removed after taking initial and final travelling point [Total travelling limit ____ (min) to ____(max)] at Gearbox shaft coupling **(Hold Point)**			
310	Stub bolts of the bearing housing to gearbox casing taken as reference point, protuding length measured			
3.14	Top casing lifted horizontally by use of EOT & chain block and shifted in flipped condition			
3.15	Pinion shaft marked			
3.16	As found backlash checked and recorded b/w shaft #01 & shaft #05			
3.16	As found backlash checked and recorded b/w shaft #05 & shaft #02			
3.16	As found backlash checked and recorded b/w shaft #02 & shaft #03			
3.16	As found backlash checked and recorded b/w shaft #03 & shaft #04			
3.18	As found axial play measured & recorded for shaft #01 & #05			
3.19	Bearing clearance checked and recorded for bearing shaft #01 & #05			
320	Distance from housing flange to bearing bushing measured & recorded			
3.21	Input shaft assembly removed & shifted to the workshop			
3.22	Pinion shaft #05 hooked up and shifted to the workshop			
3.23	Saddle crack checked Note: Are there any shaddle Crack found **(Hold Point)**			
3.24	If saddle crack found, torsional shaft top casing removed & inspected			
3.25	Recommended by S-CHEM AED torsional shaft removed after taking measurements (backlash for both output shafts #02, #03 & #04 bearing clearance. Please provide backlash limits			
3.26	Torsional shaft assembly removed and shifted to the workshop for bearing replacement recommended by S-CHEM AED			
3.27	Final Machining performed for Pre-fabricate PROSETIC Part & Upper saddle Part of Shaft No#02 and inspected			
3.28	All the bearings removed by pullers/heating torch/gas cutting for shaft #01 & #05.			
3.29	Measured & recorded input shaft #01 outside diameter for bearing positions after bearings removed **(Hold point)**	1		
		2		
		3		

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	(Hold point)	4				
330	Measured & recorded intermediate shaft #05 outside diameter for bearing positions after bearings removed **(Hold point)**	1				
		2				
3.31	Measured & recorded torsional shaft #04 outside diameter for bearing positions after bearings removed **(Hold point)**	1				
		2				
		3				
		4				
3.32	DPT performed for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.33	FLORSCENT TEST performed for the gear teeth for shaft no. #04, shaft no. #01 & shaft no. #05. **(Hold point)**					
3.34	OD checked and recorded for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.35	New bearings inner diameter checked & recorded for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.36	Inspected the new bearing & bearing position of shaft before installation **(Hold point)**					
3.37	New bearing heated in oven up to 120 degree and installed at shaft position for shaft no. #04, shaft no. #01 & shaft no. #05.					
3.38	Casing cleaned and inspected					
3.39	Lube oil nozzles and orifice cleaned					
340	Torsional shaft no #04 assembly installed at position and inspected					
3.41	Pinion shaft no. #05 assembly installed at position and inspected					
3.42	Input shaft assembly #01 installed at position and inspected					
3.43	As left backlashchecked & recorded between input shaft#01 & pinion shaft#05.					
3.44	As left Backlash checked & recorded between pinion shaft#02 & #04 & helical pinion shaft#03 & #04. and it will be verified by GAS.					
3.45	As axial play will be measure and record for shaft #01 & #05 and it will be verified by GAS					
3.46	All the bearing clearences measured and recorded and it will be verified by gas.					
3.47	Top casing cleaned & installed at position, tapered pin and bolts installed					
3.48	Torquing done as per specified value					
3.49	Stub bolts of the bearing housing cover to the gear box casing bolts torqued as per specified torque value.					
350	DESCH coupling installed at location & travel range is (17 mm to 21mm) and friction assembly installed.(Note: Desch coupling hub is tapered fit)					
3.51	Friction assembly will be installed at marked position					
3.52	As left alignment checked and recorded between main motor and gearbox. R alignment protocol for reference **(Hold Point)** Readings:					
3.53	Gearbox output shafts spline coupling removed.					
3.54	Grease removed from the splines and gear as required					
3.55	New grease applied after inspection					
3.56	All lube oil lines installed with new gaskets.					
3.57	Flange integrity done before gasket installation by S-CHEM					
3.58	All instrument connection, probes, cable wire installed by GAS with S-CHEM instrument team					
3.59	Electrical connection of exhaust fan from the roof connected by GAS with S-CHEM electrical team					
360	Electrical oil heaters switched on as required					
3.61	Scaffolding removed by S-CHEM assigned scaffolding team					
3.62	Housekeeping done & permit closed					
3.62	Machine handed over to S-CHEM					

Equipment Tag No.			
Completion Date:			
Executer Name:		**Sign:**	
Client supervisor Name		**Sign:**	

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

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INSPECTION REPORT

EXTRUDER OVERHAULING (PELLETIZER UNIT)

EQUIPMENT TAG NO:		PLANT	HDPE	DATE	
1.0 Following requirements & involved hazards to be checked.		**YES**		**NO**	**Remarks**
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.				
1.2	Take work permit and ensure equipment preparation for maintenance .				
1.3	Shall ensure proper lock out & tag out.				
1.4	All required PPE's to be ensured for their healthiness for use.				
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**		**NO**	
2.1	Technician must be qualified.				
2.2	Proper & safe access/approach is available for execution of overhauling job.				
2.3	Ensure all team members are aware of the SOW.				
2.4	Ensure all team members are using working gloves.				
2.5	Only one technician to rotate chain sprocket to prevent finger injury.				
3.0 Clearances to be recorded during CM activity		AS FOUND		AS LEFT	
3.1	Alignment between gearbox and motor by using laser				
3.2	DBSE between gearbox and motor				
3.3	Hub reference on the motor shaft				
3.4	Hub reference on the Gearbox shaft				
3.5	Alignment between the gearbox and pelletizer shaft				
3.6	DBSE between Gearbox and Pelletizer				
3.7	Hub reference on the gearbox shaft (Pelletizer side)				
3.8	Hub reference on the Pelletizer shaft				
3.9	Check cardan shaft backlash				
4.0	Alignment between pelletizer Cutter hub to Die plate				
4.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES		NO	
4.1	Gear box oil filling done				Write the oil specification
4.2	Replace the Brinded water inlet and outlet hose with specified gasket				
4.3	Ensure torque tightening of pelletizer knife in sequence				Torque valve
4.4	Replace the docking pin and docking cylinders				
4.5	Replace o ring for pelletizer water box				
4.6	Greasing for pelletizer shaft Bearings				

GAS QA / QC

Name		Signature		ID#		Date	

GAS PM APPROVAL

Name		Signature		ID#		Date	

S-CHEM APRROVAL

Accepted			REJECTED		
Name		Signature		ID#		Date	

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

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INSPECTION REPORT

EXTRUDER OVERHAULING (PELLETIZER UNIT)

EQUIPMENT TAG NO:		PLANT	LLDPE	DATE	
1.0 Following requirements & involved hazards to be checked.		**YES**		**NO**	**Remarks**
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.				
1.2	Take work permit and ensure equipment preparation for maintenance .				
1.3	Shall ensure proper lock out & tag out.				
1.4	All required PPE's to be ensured for their healthiness for use.				
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**		**NO**	
2.1	Technician must be qualified.				
2.2	Proper & safe access/approach is available for execution of overhauling job.				
2.3	Ensure all team members are aware of the SOW.				
2.4	Ensure all team members are using working gloves.				
2.5	Only one technician to rotate chain sprocket to prevent finger injury.				
3.0 Clearances to be recorded during CM activity		AS FOUND		AS LEFT	
3.1	Alignment between gearbox and motor by using laser				
3.2	DBSE between gearbox and motor				
3.3	Hub reference on the motor shaft				
3.4	Hub reference on the Gearbox shaft				
3.5	Alignment between the gearbox and pelletizer shaft				
3.6	DBSE between Gearbox and Pelletizer				
3.7	Hub reference on the gearbox shaft (Pelletizer side)				
3.8	Hub reference on the Pelletizer shaft				
3.9	Check cardan shaft backlash				
4.0	Alignment between pelletizer Cutter hub to Die plate				
4.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES		NO	
4.1	Gear box oil filling done				Write the oil specification
4.2	Replace the Brinded water inlet and outlet hose with specified gasket				
4.3	Ensure torque tightening of pelletizer knife in sequence				Torque valve
4.4	Replace the docking pin and docking cylinders				
4.5	Replace o ring for pelletizer water box				
4.6	Greasing for pelletizer shaft Bearings				

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Name		Signature		ID#		Date	

GAS PM APPROVAL

Name		Signature		ID#		Date	

S-CHEM APRROVAL

Accepted			REJECTED		
Name		Signature		ID#		Date	

REMARKS

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INSPECTION REPORT

EXTRUDER OVERHAULING (PELLETIZER UNIT)

EQUIPMENT TAG NO:		PLANT	PP	DATE	
1.0 Following requirements & involved hazards to be checked.		**YES**		**NO**	**Remarks**
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.				
1.2	Take work permit and ensure equipment preparation for maintenance .				
1.3	Shall ensure proper lock out & tag out.				
1.4	All required PPE's to be ensured for their healthiness for use.				
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**		**NO**	
2.1	Technician must be qualified.				
2.2	Proper & safe access/approach is available for execution of overhauling job.				
2.3	Ensure all team members are aware of the SOW.				
2.4	Ensure all team members are using working gloves.				
2.5	Only one technician to rotate chain sprocket to prevent finger injury.				
3.0 Clearances to be recorded during CM activity		AS FOUND		AS LEFT	
3.1	Alignment between gearbox and motor by using laser				
3.2	DBSE between gearbox and motor				
3.3	Hub reference on the motor shaft				
3.4	Hub reference on the Gearbox shaft				
3.5	Alignment between the gearbox and pelletizer shaft				
3.6	DBSE between Gearbox and Pelletizer				
3.7	Hub reference on the gearbox shaft (Pelletizer side)				
3.8	Hub reference on the Pelletizer shaft				
3.9	Check cardan shaft backlash				
4.0	Alignment between pelletizer Cutter hub to Die plate				
4.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES		NO	
4.1	Gear box oil filling done				Write the oil specification
4.2	Replace the Brinded water inlet and outlet hose with specified gasket				
4.3	Ensure torque tightening of pelletizer knife in sequence				Torque valve
4.4	Replace the docking pin and docking cylinders				
4.5	Replace o ring for pelletizer water box				
4.6	Greasing for pelletizer shaft Bearings				

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Name		Signature		ID#		Date	

GAS PM APPROVAL

Name		Signature		ID#		Date	

S-CHEM APRROVAL

Accepted			REJECTED				
Name		Signature		ID#		Date	

REMARKS

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INSPECTION REPORT

EXTRUDER OVERHAULING (DIE PLATE)

EQUIPMENT TAG NO:		PLANT	HDPE	DATE	
1.0 Following requirements & involved hazards to be checked.		**YES**		**NO**	**Remarks**
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.				
1.2	Take work permit and ensure equipment preparation for maintenance .				
1.3	Shall ensure proper lock out & tag out.				
1.4	All required PPE's to be ensured for their healthiness for use.				
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**		**NO**	
2.1	Technician must be qualified.				
2.2	Proper & safe access/approach is available for execution of overhauling job.				
2.3	Ensure all team members are aware of the SOW.				
2.4	Ensure all team members are using working gloves.				
2.5	Only one technician to rotate chain sprocket to prevent finger injury.				
3.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES		NO	
3.1	Cleaning of Die plate holder and Die plate				
3.2	Visual Inspection of Die plate (Ensure Polymer passage hole shall be free from derbis)				
3.3	Replace Die plate mounting O ring				
3.4	Hot oil / Steam line flange connection with specified gasket				
3.5	Hot Torquing of Die plate as per specified torque in specified temperature 1.) Temperature .....deg Torque .....NM 2.)Temperature .....deg Torque .....NM 3.)Temperature .....deg Torque .....NM				
3.6	Replace and Tightening of Ceramic insulation and aflas seal with specified allen screw				

GAS QA / QC

Name		Signature		ID#		Date	

GAS PM APPROVAL

Name		Signature		ID#		Date	

S-CHEM APRROVAL

Accepted			REJECTED		
Name		Signature		ID#		Date	

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

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INSPECTION REPORT

EXTRUDER OVERHAULING (DIE PLATE)

EQUIPMENT TAG NO:		PLANT	LLDPE	DATE	
1.0 Following requirements & involved hazards to be checked.		**YES**		**NO**	**Remarks**
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.				
1.2	Take work permit and ensure equipment preparation for maintenance .				
1.3	Shall ensure proper lock out & tag out.				
1.4	All required PPE's to be ensured for their healthiness for use.				
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**		**NO**	
2.1	Technician must be qualified.				
2.2	Proper & safe access/approach is available for execution of overhauling job.				
2.3	Ensure all team members are aware of the SOW.				
2.4	Ensure all team members are using working gloves.				
2.5	Only one technician to rotate chain sprocket to prevent finger injury.				
3.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES		NO	
3.1	Cleaning of Die plate holder and Die plate				
3.2	Visual Inspection of Die plate (Ensure Polymer passage hole shall be free from derbis)				
3.3	Replace Die plate mounting O ring				
3.4	Hot oil / Steam line flange connection with specified gasket				
3.5	Hot Torquing of Die plate as per specified torque in specified temperature 1.) Temperature .....deg Torque .....NM 2.)Temperature .....deg Torque .....NM 3.)Temperature .....deg Torque .....NM				
3.6	Replace and Tightening of Ceramic insulation and aflas seal with specified allen screw				

GAS QA / QC

Name		Signature		ID#		Date	

GAS PM APPROVAL

Name		Signature		ID#		Date	

S-CHEM APRROVAL

Accepted			REJECTED		
Name		Signature		ID#		Date	

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

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INSPECTION REPORT

EXTRUDER OVERHAULING (DIE PLATE)

EQUIPMENT TAG NO:		PLANT	HDPE	DATE	
1.0 Following requirements & involved hazards to be checked.		**YES**		**NO**	**Remarks**
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.				
1.2	Take work permit and ensure equipment preparation for maintenance .				
1.3	Shall ensure proper lock out & tag out.				
1.4	All required PPE's to be ensured for their healthiness for use.				
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**		**NO**	
2.1	Technician must be qualified.				
2.2	Proper & safe access/approach is available for execution of overhauling job.				
2.3	Ensure all team members are aware of the SOW.				
2.4	Ensure all team members are using working gloves.				
2.5	Only one technician to rotate chain sprocket to prevent finger injury.				
3.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES		NO	
3.1	Cleaning of Die plate holder and Die plate				
3.2	Visual Inspection of Die plate (Ensure Polymer passage hole shall be free from derbis)				
3.3	Replace Die plate mounting O ring				
3.4	Hot oil / Steam line flange connection with specified gasket				
3.5	Hot Torquing of Die plate as per specified torque in specified temperature 1.) Temperature .....deg Torque .....NM 2.)Temperature .....deg Torque .....NM 3.)Temperature .....deg Torque .....NM				
3.6	Replace and Tightening of Ceramic insulation and aflas seal with specified allen screw				

GAS QA / QC							
Name		Signature		ID#		Date	
GAS PM APPROVAL							
Name		Signature		ID#		Date	
S-CHEM APRROVAL							
Accepted				REJECTED			
Name		Signature		ID#		Date	

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

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GAS ARABIAN SERVICES

QA / QC Department

INSPECTION REPORT

EXTRUDER OVERHAULING (DIE PLATE)

EQUIPMENT TAG NO:		PLANT	PP	DATE	

1.0 Following requirements & involved hazards to be checked.		**YES**	**NO**	**Remarks**
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.			
1.2	Take work permit and ensure equipment preparation for maintenance .			
1.3	Shall ensure proper lock out & tag out.			
1.4	All required PPE's to be ensured for their healthiness for use.			
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**	**NO**	
2.1	Technician must be qualified.			
2.2	Proper & safe access/approach is available for execution of overhauling job.			
2.3	Ensure all team members are aware of the SOW.			
2.4	Ensure all team members are using working gloves.			
2.5	Only one technician to rotate chain sprocket to prevent finger injury.			
3.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES	NO	
3.1	Cleaning of Die plate holder and Die plate			
3.2	Visual Inspection of Die plate (Ensure Polymer passage hole shall be free from derbis)			
3.3	Replace Die plate mounting O ring			
3.4	Hot oil / Steam line flange connection with specified gasket			
3.5	Hot Torquing of Die plate as per specified torque in specified temperature 1.) Temperature .....deg Torque .....NM 2.)Temperature .....deg Torque .....NM 3.)Temperature .....deg Torque .....NM			
3.6	Replace and Tightening of Ceramic insulation and aflas seal with specified allen screw			

GAS QA / QC

Name		Signature		ID#		Date	

GAS PM APPROVAL

Name		Signature		ID#		Date	

S-CHEM APRROVAL

Accepted			REJECTED				
Name		Signature		ID#		Date	

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

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GAS ARABIAN SERVICES

QA / QC Department

INSPECTION REPORT

EXTRUDER OVERHAULING (DIE PLATE)

EQUIPMENT TAG NO:		PLANT	PP	DATE	
1.0 Following requirements & involved hazards to be checked.		**YES**		**NO**	**Remarks**
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition.				
1.2	Take work permit and ensure equipment preparation for maintenance .				
1.3	Shall ensure proper lock out & tag out.				
1.4	All required PPE's to be ensured for their healthiness for use.				
2.0 Following minimum requirement to be complied and insured before executing the work.		**YES**		**NO**	
2.1	Technician must be qualified.				
2.2	Proper & safe access/approach is available for execution of overhauling job.				
2.3	Ensure all team members are aware of the SOW.				
2.4	Ensure all team members are using working gloves.				
2.5	Only one technician to rotate chain sprocket to prevent finger injury.				
3.0	**ENSURE THE FOLLOWING DURING OVERHAULING**	YES		NO	
3.1	Cleaning of Die plate holder and Die plate				
3.2	Visual Inspection of Die plate (Ensure Polymer passage hole shall be free from derbis)				
3.3	Replace Die plate mounting O ring				
3.4	Hot oil / Steam line flange connection with specified gasket				
3.5	Hot Torquing of Die plate as per specified torque in specified temperature 1.) Temperature .....deg Torque .....NM 2.)Temperature .....deg Torque .....NM 3.)Temperature .....deg Torque .....NM				
3.6	Replace and Tightening of Ceramic insulation and aflas seal with specified allen screw				

GAS QA / QC

Name		Signature		ID#		Date	

GAS PM APPROVAL

Name		Signature		ID#		Date	

S-CHEM APRROVAL

Accepted			REJECTED		
Name		Signature		ID#		Date	

REMARKS

NOTE: Further updates will be done once we receive the detailed drawings

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GAS ARABIAN SERVICES

QA / QC Department

INSPECTION REPORT

EQUIPMENT TYPE : ROTARY DRYER

EQUIPMENT TAG NO :		PLANT	HDPE	DATE	

#	Check description	YES	NO	Remarks
1.0 Following requirements & involved hazards to be checked.				
1.1	Tools, tackles & special tools required shall be inspected and should be in usable condition.			
1.2	Take work permit and ensure equip. preparation for maintenance.			
1.3	Shall ensure proper lock out & tag out.			
1.4	All required PPE's to be ensured for their healthiness for use.			
2.0 Following minimum requirement to be complied and insured before executing the work.				
2.1	Technician must be qualified.			
2.2	Proper & safe access/approach is available for execution of replacement job.			
2.3	Ensure all team members are aware of the SOW.			
2.4	Ensure all team members are using leather gloves.			
3.0 General check points for Belt and pulley relplacement activities:		**YES**	**NO**	**Remarks**
3.1	As found Belt tension & pulley alignment to be checked and recorded (if required)			
3.2	Check screen support rings and screen condition for any damage.			
3.3	Inspect both pulleys for cracks worn out and corrosion.			
3.4	Take the reference of pulley on the motor shaft.			
3.5	Take the reference of pulley on the dryer shaft.			
3.6	Inspect taper bush for cracks and corrosion.			
3.7	Shaft OD and new pulley ID for dryer and motor measurement check.			
3.8	Clearararance check for point no. 3.6			
3.9	Check Top bearing ID and shaft OD			
4.00	Check bottom bearing ID and shaft OD			
4.1	Visually inspect the new belts & pulley condition.			
4.2	Check the belt contact with both pulley properly			
4.3	Maintain required tension and make sure both pulleys are alligned properly(As Left)			
4.4	Check and ensure belts/pulleys are not touching the belt guard			
4.5	Install back belts guard in position.			

GAS QA / QC

Name		Signature		ID#		Date	

GAS PM APPROVAL

Name		Signature		ID#		Date	

APPC APPROVAL

Accepted		Rejected	

Name		Signature		ID#		Date	

Remarks :

NOTE: Further updates will be done once we receive the detailed drawings

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QA / QC Department

INSPECTION REPORT

EQUIPMENT TYPE : ROTARY DRYER

EQUIPMENT TAG NO :		PLANT	LLPDE	DATE	

#	Check description	YES	NO	Remarks
1.0 Following requirements & involved hazards to be checked.				
1.1	Tools, tackles & special tools required shall be inspected and should be in usable condition.			
1.2	Take work permit and ensure equip. preparation for maintenance.			
1.3	Shall ensure proper lock out & tag out.			
1.4	All required PPE's to be ensured for their healthiness for use.			
2.0 Following minimum requirement to be complied and insured before executing the work.				
2.1	Technician must be qualified.			
2.2	Proper & safe access/approach is available for execution of replacement job.			
2.3	Ensure all team members are aware of the SOW.			
2.4	Ensure all team members are using leather gloves.			
3.0 General check points for Belt and pulley relplacement activities:		**YES**	**NO**	**Remarks**
3.1	As found Belt tension & pulley alignment to be checked and recorded (if required)			
3.2	Check screen support rings and screen condition for any damage.			
3.3	Inspect both pulleys for cracks worn out and corrosion.			
3.4	Take the reference of pulley on the motor shaft.			
3.5	Take the reference of pulley on the dryer shaft.			
3.6	Inspect taper bush for cracks and corrosion.			
3.7	Shaft OD and new pulley ID for dryer and motor measurement check.			
3.8	Clearararance check for point no. 3.7			
3.9	Check Top bearing ID and shaft OD			
4.0	Check bottom bearing ID and shaft OD			
4.1	Visually inspect the new belts & pulley condition.			
4.2	Check the belt contact with both pulley properly			
4.3	Maintain required tension and make sure both pulleys are alligned properly(As Left)			
4.4	Check and ensure belts/pulleys are not touching the belt guard			
4.5	Install back belts guard in position.			

GAS PM APPROVAL

Name		Signature		ID#		Date	

APPC APPROVAL

Accepted		Rejected	

Name		Signature		ID#		Date	

Remarks :

NOTE: Further updates will be done once we receive the detailed drawings

GAS-QAP-DRYER-CKL-001

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QA / QC Department

INSPECTION REPORT

EQUIPMENT TYPE : ROTARY DRYER

EQUIPMENT TAG NO :		PLANT	PP	DATE	

#	Check description	YES	NO	Remarks
1.0 Following requirements & involved hazards to be checked.				
1.1	Tools, tackles & special tools required shall be inspected and should be in usable condition.			
1.2	Take work permit and ensure equip. preparation for maintenance.			
1.3	Shall ensure proper lock out & tag out.			
1.4	All required PPE's to be ensured for their healthiness for use.			
2.0 Following minimum requirement to be complied and insured before executing the work.				
2.1	Technician must be qualified.			
2.2	Proper & safe access/approach is available for execution of replacement job.			
2.3	Ensure all team members are aware of the SOW.			
2.4	Ensure all team members are using leather gloves.			
3.0 General check points for Belt and pulley relplacement activities:		**YES**	**NO**	**Remarks**
3.1	As found Belt tension & pulley alignment to be checked and recorded (if required)			
3.2	Check screen support rings and screen condition for any damage.			
3.3	Inspect both pulleys for cracks worn out and corrosion.			
3.4	Take the reference of pulley on the motor shaft.			
3.5	Take the reference of pulley on the dryer shaft.			
3.6	Inspect taper bush for cracks and corrosion.			
3.7	Shaft OD and new pulley ID for dryer and motor measurement check.			
3.8	Cleararance check for point no. 3.7			
3.9	Check Top bearing ID and shaft OD			
4.00	Check bottom bearing ID and shaft OD			
4.1	Visually inspect the new belts & pulley condition.			
4.2	Check the belt contact with both pulley properly			
4.3	Maintain required tension and make sure both pulleys are alligned properly(As Left)			
4.4	Check and ensure belts/pulleys are not touching the belt guard			
4.5	Install back belts guard in position.			

GAS PM APPROVAL

Name		Signature		ID#		Date	

APPC APPROVAL

Accepted		Rejected	

Name		Signature		ID#		Date	

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GAS ARABIAN SERVICES
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INSPECTION REPORT
EQUIPMENT TYPE : PELLETIZER GEARBOX

EQUIPMENT TAG NO :		PLANT	LLDPE	DATE :	

1.0 Following requirements & involved hazards to be checked.		YES	NO
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition in accodance.		
1.2	Take work permit and ensure equipment preparation for maintenance .		
1.3	Shall ensure proper lock out & tag out.		
1.4	All required PPE's to be ensured for their healthiness for use.		

2.0 Following minimum requirement to be complied and insured before executing the work.		YES	NO
2.1	Technician must be qualified.		
2.2	Proper & safe access/approach is available for execution of overhauling job.		
2.3	Ensure all team members are aware of the SOW.		
2.4	Ensure all team members are using working gloves.		
2.5	Only one technician to rotate chain sprocket to prevent finger injury.		

3.0	Check		Inspection	Design	As		As		
SN.	Point	Activity	Method	Value	Found		Left	Remarks	
	Bearing – Journal / Roller type								
3.1	Input Shaft Gear	Check bearing clearance	Measurement						
3.2		Bearing ID	Measurement						
3.3		Shaft OD bearing position	Measurement						
3.4		Bearing Condition	Visual inspection						
3.5		Check axial float	Measurement						
3.6		Backlash	Measurement						
3.7		Check condition of gear teeth	Visual inspection & DPT						
3.8		Check tooth contact	Blue matching	80% Min.					
3.9	Intermediate shaft Gear 1	Check bearing clearance	Measurement						
3.10		Bearing ID	Measurement						
3.11		Shaft OD bearing position	Measurement						
3.12		Bearing Condition	Visual inspection						
3.13		Check axial float	Measurement						
3.14		Backlash	Measurement						
3.15		Check condition of gear teeth	Visual inspection & DPT						
3.16		Check tooth contact	Blue matching	80% Min.					
3.17		Check bearing clearance	Measurement						
3.18		Bearing ID	Measurement						
3.19		shaft OD bearing position	Measurement						

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3.20	Intermediate shaft Gear 2	Bearing Condition	Visual inspection							
3.21		Check axial float	Measurement							
3.22		Backlash	Measurement							
3.23		Check condition of gear teeth	Visual inspection & DPT							
3.24		Check tooth contact	Blue matching	80% Min.						
3.25	Main Output shaft Gear	Check bearing clearance	Measurement							
3.26		Bearing ID	Measurement							
3.27		shaft OD bearing position	Measurement							
3.28		Check axial float	Measurement							
3.29		Backlash	Measurement							
3.30		Check condition of gear teeth	Visual inspection & DPT							
3.31		Check tooth contact	Blue matching	80% Min.						
3.32		Check tooth contact	Blue matching	80% Min.						
3.33	Lubrication	Renew oil seal								
3.34		Check for lube oil leakage and rectify it	Visual inspection	Zero leakage						
3.35		Check pressure regulating valve/device	Visual inspection	-						
3.36		Renew lube oil	-	Oil Grade -						
3.37		Clean housing	Visual Inspection							
3.38	Coupling	Inspect coupling hub		-						
3.39		Referance reading **Hub end to shaft end**	Measurement							
3.4		Inspect spacer	Visual inspection							
3.41		Inspect fasteners								
3.42		Check DBSE	Measurement							

4.0 Clearances to be recorded during CM activity

Measure and record the following		**AS FOUND**	**AS LEFT**
4.1	Axial float of motor (MM)		
4.2	Radial play of motor (MM)		
4.3	Axial float of Gearbox Input shaft (MM)		
4.4	Radial play of Gearbox output shaft (MM)		
4.5	Seal Clearances (MM)		
4.6	Shaft Runout (MM)		
4.7	Bearing Clearances to be recorded (MM)		

5.0 Check following points during initial startup		**YES**	**NO**
5.1	Check for any abnormal sound		
5.2	Confirm that the job is completed as per scope and all removed bolts supports insulation installed back as applicable		

GAS QA / QC APPROVAL				
Name		Signature	ID :	DATE :

GAS PM APPROVAL				
Name		Signature	ID :	DATE :

S-CHEM APPROVAL					
Accepted		Rejected			
Name		Signature		ID :	DATE :

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GAS ARABIAN SERVICES
QA / QC Department
INSPECTION REPORT
EQUIPMENT TYPE : PELLETIZER GEARBOX

EQUIPMENT TAG NO :		PLANT	HDPE	DATE :	

1.0 Following requirements & involved hazards to be checked.		YES	NO
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition in accodance.		
1.2	Take work permit and ensure equipment preparation for maintenance .		
1.3	Shall ensure proper lock out & tag out.		
1.4	All required PPE's to be ensured for their healthiness for use.		

2.0 Following minimum requirement to be complied and insured before executing the work.		YES	NO
2.1	Technician must be qualified.		
2.2	Proper & safe access/approach is available for execution of overhauling job.		
2.3	Ensure all team members are aware of the SOW.		
2.4	Ensure all team members are using working gloves.		
2.5	Only one technician to rotate chain sprocket to prevent finger injury.		

3.0	Check		Inspection	Design	As		As		
SN.	Point	Activity	Method	Value	Found		Left	Remarks	
	Bearing – Journal / Roller type								
3.1	Input Shaft Gear	Check bearing clearance	Measurement						
3.2		Bearing ID	Measurement						
3.3		Shaft OD bearing position	Measurement						
3.4		Bearing Condition	Visual inspection						
3.5		Check axial float	Measurement						
3.6		Backlash	Measurement						
3.7		Check condition of gear teeth	Visual inspection & DPT						
3.8		Check tooth contact	Blue matching	80% Min.					
3.9	Intermediate shaft Gear 1	Check bearing clearance	Measurement						
3.10		Bearing ID	Measurement						
3.11		Shaft OD bearing position	Measurement						
3.12		Bearing Condition	Visual inspection						
3.13		Check axial float	Measurement						
3.14		Backlash	Measurement						
3.15		Check condition of gear teeth	Visual inspection & DPT						
3.16		Check tooth contact	Blue matching	80% Min.					
3.17		Check bearing clearance	Measurement						
3.18		Bearing ID	Measurement						
3.19		shaft OD bearing position	Measurement						

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3.20	Intermediate shaft Gear 2	Bearing Condition	Visual inspection						
3.21		Check axial float	Measurement						
3.22		Backlash	Measurement						
3.23		Check condition of gear teeth	Visual inspection & DPT						
3.24		Check tooth contact	Blue matching	80% Min.					
3.25	Main Output shaft Gear	Check bearing clearance	Measurement						
3.26		Bearing ID	Measurement						
3.27		shaft OD bearing position	Measurement						
3.28		Check axial float	Measurement						
3.29		Backlash	Measurement						
3.30		Check condition of gear teeth	Visual inspection & DPT						
3.31		Check tooth contact	Blue matching	80% Min.					
3.32		Check tooth contact	Blue matching	80% Min.					
3.33	Lubrication	Renew oil seal							
3.34		Check for lube oil leakage and rectify it	Visual inspection	Zero leakage					
3.35		Check pressure regulating valve/device	Visual inspection	-					
3.36		Renew lube oil	-	Oil Grade -					
3.37		Clean housing	Visual Inspection						
3.38	Coupling	Inspect coupling hub		-					
3.39		Referance reading **Hub end to shaft end**	Measurement						
3.4		Inspect spacer	Visual inspection						
3.41		Inspect fasteners							
3.42		Check DBSE	Measurement						

4.0 Clearances to be recorded during CM activity

Measure and record the following		**AS FOUND**	**AS LEFT**
4.1	Axial float of motor (MM)		
4.2	Radial play of motor (MM)		
4.3	Axial float of Gearbox Input shaft (MM)		
4.4	Radial play of Gearbox output shaft (MM)		
4.5	Seal Clearances (MM)		
4.6	Shaft Runout (MM)		
4.7	Bearing Clearances to be recorded (MM)		

5.0 Check following points during initial startup		**YES**	**NO**
5.1	Check for any abnormal sound		
5.2	Confirm that the job is completed as per scope and all removed bolts supports insulation installed back as applicable		

GAS QA / QC APPROVAL

Name		Signature		ID :	DATE :

GAS PM APPROVAL

Name		Signature		ID :	DATE :

S-CHEM APPROVAL

Accepted		Rejected			
Name		Signature		ID :	DATE :

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GAS ARABIAN SERVICES
QA / QC Department
INSPECTION REPORT
EQUIPMENT TYPE : PELLETIZER GEARBOX

EQUIPMENT TAG NO :		PLANT	HDPE	DATE :	

1.0 Following requirements & involved hazards to be checked.		YES	NO
1.1	Tools,tackles & special tools required shall be inspected and should be in usable condition in accodance.		
1.2	Take work permit and ensure equipment preparation for maintenance .		
1.3	Shall ensure proper lock out & tag out.		
1.4	All required PPE's to be ensured for their healthiness for use.		

2.0 Following minimum requirement to be complied and insured before executing the work.		YES	NO
2.1	Technician must be qualified.		
2.2	Proper & safe access/approach is available for execution of overhauling job.		
2.3	Ensure all team members are aware of the SOW.		
2.4	Ensure all team members are using working gloves.		
2.5	Only one technician to rotate chain sprocket to prevent finger injury.		

3.0	Check		Inspection	Design	As		As		
SN.	Point	Activity	Method	Value	Found		Left	Remarks	
	Bearing – Journal / Roller type								
3.1	Input Shaft Gear	Check bearing clearance	Measurement						
3.2		Bearing ID	Measurement						
3.3		Shaft OD bearing position	Measurement						
3.4		Bearing Condition	Visual inspection						
3.5		Check axial float	Measurement						
3.6		Backlash	Measurement						
3.7		Check condition of gear teeth	Visual inspection & DPT						
3.8		Check tooth contact	Blue matching	80% Min.					
3.9	Intermediate shaft Gear 1	Check bearing clearance	Measurement						
3.10		Bearing ID	Measurement						
3.11		Shaft OD bearing position	Measurement						
3.12		Bearing Condition	Visual inspection						
3.13		Check axial float	Measurement						
3.14		Backlash	Measurement						
3.15		Check condition of gear teeth	Visual inspection & DPT						
3.16		Check tooth contact	Blue matching	80% Min.					

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3.17	Intermediate shaft Gear 2	Check bearing clearance	Measurement							
3.18		Bearing ID	Measurement							
3.19		shaft OD bearing position	Measurement							
3.20		Bearing Condition	Visual inspection							
3.21		Check axial float	Measurement							
3.22		Backlash	Measurement							
3.23		Check condition of gear teeth	Visual inspection & DPT							
3.24		Check tooth contact	Blue matching	80% Min.						
3.25	Main Output shaft Gear	Check bearing clearance	Measurement							
3.26		Bearing ID	Measurement							
3.27		shaft OD bearing position	Measurement							
3.28		Check axial float	Measurement							
3.29		Backlash	Measurement							
3.30		Check condition of gear teeth	Visual inspection & DPT							
3.31		Check tooth contact	Blue matching	80% Min.						
3.32		Check tooth contact	Blue matching	80% Min.						
3.33	Lubrication	Renew oil seal								
3.34		Check for lube oil leakage and rectify it	Visual inspection	Zero leakage						
3.35		Check pressure regulating valve/device	Visual inspection	-						
3.36		Renew lube oil	-	Oil Grade						
3.37		Clean housing	Visual Inspection							
3.38	Coupling	Inspect coupling hub		-						
3.39		Referance reading **Hub end to shaft end**	Measurement							
3.4		Inspect spacer	Visual inspection							
3.41		Inspect fasteners								
3.42		Check DBSE	Measurement							

Measure and record the following		**AS FOUND**	**AS LEFT**
4.1	Axial float of motor (MM)		
4.2	Radial play of motor (MM)		
4.3	Axial float of Gearbox Input shaft (MM)		
4.4	Radial play of Gearbox output shaft (MM)		
4.5	Seal Clearances (MM)		
4.6	Shaft Runout (MM)		
4.7	Bearing Clearances to be recorded (MM)		

GAS QA / QC APPROVAL				
Name		Signature	ID :	DATE :

GAS PM APPROVAL				
Name		Signature	ID :	DATE :

S-CHEM APPROVAL				
Accepted		**Rejected**		
Name		Signature	ID :	DATE :

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SAFETY PACKAGE

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S-CHEM EHSS Plan

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S-Chem

ENVIRONMENTAL HEALTH AND SAFETY PLAN FOR S-CHEM TAM - 2022 ROTATING EQUIPMENT SERVICES

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TURN-AROUNDS & SHUTDOWNS

A Turnaround – which is sometimes referred to as a TAR – is a highly-expensive planned period of regeneration in a petrochemical plant, power plant or refinery plant. During this time, an entire part of the operation is off-lined whilst plants are inspected and revamped. Not only are the tools and labor required for executing a turnaround extremely expensive, but the revenue lost through shutting down elements of production can amount to a significant portion of an annual budget. Turnarounds often throw up more issues than anticipated, making them difficult to keep on track, and requiring very experienced managers.

Crucially, all shutdowns and turnarounds should be well-defined, planned realistically, and executed efficiently. Failure to fully realize any one stage of the STO process could result in delays, costs, and potential damage to the business.

Unlike turnarounds, shutdowns are not always planned. Often, if supplies of natural gas or other reagents needed for the manufacture of gasoline are lacking, refineries will simply grind to a halt. These supplies can be found wanting if the natural resources are scarce, or prices are simply too high – often, one as a result of the other. Shutdowns and turnarounds can also occur when accidents, natural disasters, terror threats, or political upheavals occur.

Turnaround activities may include preventative care of equipment, general corrective repair of faults, strip-downs, complete replacement and overhaul, or maintenance.

The goal for all types of interruption should be to achieve a return to normal process within time (difficult in outages), on budget, with no harm to staff, and with as little unplanned work as possible. Additional goals often include a forward plan which should aim to extend the period between shutdowns, and set out how to implement short, targeted periods of maintenance.

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SECTION 1: HSE STATEMENT POLICY

Health & Safety Policy

GAS / HSE Policy together with client's specific requirement from the basis for this plan and its implementation on this project. HSE policies are considered to be a project value and not subject compromise.

GAS shall recognize and accept its responsibilities as an employer for providing a safe and healthy place of work free from environment danger. It will continue to be the policy of GAS to promote the highest standards of safety and health for GAS employees and for all other persons who are part of the shutdowns.

Health hazards and personal injuries are preventable through worker awareness, training and safe work practices. All employees must accept responsibility to comply with such measures if they are to attain the quality of working life they are entitled to.

The objective of a health and safety program is to implement measures to reduce and/or eliminate potential health hazards and personal injury in the workplace. A health and safety program is not initiated to lay blame or fault should an incident occur.

The ongoing active involvement and support of both employees and management, in the workplace health and safety program, is essential for its success.

Objectives:

The general Health and safety policy statement is intended to provide guidelines to:

1. Safe plant and equipment.
2. Systems of work that is healthy and safe.
3. Safe arrangements for handling, usage, storage and transportation of materials and substances.
4. Sufficient training and supervision to enable all employees to avoid hazards.
5. A health working environment.
6. Emergency Evacuation Plan.
7. Occupational health.
8. Training.
9. Personal protective Equipment (PPE).

To achieve the aims of this policy, participation and co-operation on safety, health and welfare among all employees will be encouraged. No policy is likely to succeed unless it actually involves the work people themselves and Private AFFILIATES / SABIC AFFILIATES / Petrochemical Plant will provide competent technical advice on all HSE matters to assist line management wherever necessary to accomplish this task.

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SECTION 2: POLICY STATEMENT

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POLICY STATEMENT

HEALTH SAFETY AND ENVIRONMENT

GAS Arabian Services is committed to protecting the environment and promoting of health and safety measures at all levels of its operations. Environmental, Health and Safety are essential to all business functions and should never be compromised under any circumstances.

Our Objectives:

- Provide safe workplaces and healthy working environment for our employees, clients, contractors, visitors and users of our facilities.
- Promote health, safety and environment protection as an integral part of the duties of the Management along with the education of all our employees.
- Provide appropriate information, written instructions and trainings to promote a high degree of awareness of health, safety and environmental concerns and responsibility of each employee in maintaining our secured environment including health and safety hazards and working toward prevention of accidents.
- To comply with all relevant statutory and regulatory requirements covering health, safety and environment aspects in all our operational areas.
- Develop and implement policies and procedures designed to promote safe working practices and environmental protection and encourage safe operating conditions on all our project sites.

We will regularly monitor the application of these commitments to provide assurance that we are delivering continuous improvement and progressively working toward achieving our vision for HSE excellence. This policy shall be reviewed and communicated periodically to ensure applicability, awareness and support, both internally and externally.

Faisal K. AlDabal
Vice Chairman & Chief Executive Officer

Issued Date October 26, 2020

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SECTION 3: SCOPE OF WORK

1.Shut down activities:

HDPE SCOPE

Equipment Name: - Extruder
Tag No: - 42V80
Unit: - 42

1. Remove screw shafts for wear measurement.
2. Hydro blast polymer from screw shafts.
3. Unstack screw shaft elements for inspection for wear & Replacement (AWR) as recommended.
4. Verify spare screw timing using roll test before installing in barrels.
5. Clean elements and NDT splines for cracks.
6. Clean and NDT screw shaft for cracks.
7. Hydro blast barrels for inspection.
8. Measure barrel wear using COBRA instrumentation.
9. Remove barrels to replace gaskets if required due to polymer leaks. 9a; If Barrel replacement is decided after inspections, these would be replaced (AWR)
10. Overhaul the screw shaft seal if worn, replace the sealing set.
11. Check all heating and cooling connection piping and valves.
12. Check the instruments, N2 control unit of Meco seals.
13. Chemical cleaning by Acid flushing all barrel sections.
14. Perform leak test for cooling and heating circuits.
15. Replace Meco seals. 16. Grease the screw shaft couplings.

Equipment Name: - Extruder Startup valve DAV - 42A404
Tag No: - 42DAV
Unit: - 42

1. Remove DAV plug and clean excessive polymer leak.
2. Remove DAV/SUV housing for screw removal.
3. Replace hydraulic cylinder.
4. Hydro blast DAV to remove degraded polymer.

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Equipment Name: - Screen pack changers
Tag No: - 42A40 5
Unit: - 42

1. Remove screen changer housing for screw removal.
2. Remove sliders to clean and lubricate.
3. Hydro blast S/C after removal to remove degraded polymer.
4. Replacement of screen elements (independent from shut-down activity).
5. Drain hydraulic fluid from cylinders.
6. Disconnect Hydraulic oil supply and return hoses.
7. Replace hydraulic oil hoses.

Equipment Name: - SPC/DAV Hydraulic system
Tag No: - 42T90
Unit: - 42

Change the Hydraulic oil.

Equipment Name: - 42A409 - Die-plate
Tag No: - 42A40 9
Unit: - 42

To Replace on insulation ring bolts on die plate Replace die-plate.

Equipment Name: - Pelletizer
Tag No: - 42A41 0
Unit: - 42

1. Replace O-Ring at pelletizer water box.
2. Check and repair sealing face of water box.
3. Replace all bearings, seals, and O-rings of the knife shaft bearing assembly.
4. Replace the distance bushing for angular contact bearings on shaft.
5. Knife adjustment: Check hydraulic cylinders for leakage.
6. Replace springs and O-Rings of docking pins.
7. Replace docking pin and docking cylinders on the pelletizer.
8. Check of cardan-shaft for backlash and re-lubrication. If required replace.
9. Replace coupling insert between motor and gearbox.

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10. Replace of hydraulic oil filter.
11. Change hydraulic oil.
12. Replace pumps. (Refer to SPCo-SP-2507 and 2508)-to be done by Schem Team
13. Pelletizer movement: Check hydraulic cylinder for leakage.
14. Replace the gearbox bearings and inspect the gears and shafts and replace the seal.
15. Replace the Motor Bearings.

Equipment Name: - Pelletizer hydraulic oil system
Tag No: - 42T85
Unit: - 42

1.Change the Hydraulic oil

Equipment Name: - Die Head Housing
Tag No: - 42A40 8
Unit: - 42

1. Remove Die Head Housing.
2. Clean (Hydro jetting) and inspect.

Equipment Name: - Extruder gearbox
Tag No: - 42A203
Unit: - 42

1. Remove all gears shafts for bearing replacement and inspection of gears.
2. Check function of lubrication system to bearings and gear.
3. Change oil and filters.
4. Replace superposition drive backstop.
5. Replace all bearings, seals, and rotary union.
6. Verify timing of shafts.
7. Inspect lube oil piping for cracks.
8. NDT shaft and gears.
9.nspect the Desch coupling.
10.Replace Desch coupling bolts.
11. Replace Desch coupling flexible elements (buffer).
12.Inspect / replace Friction unit.

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Equipment Name: - Extruder Motor
Tag No: - 42XM8 0
Unit: - 42

Solo run the motor and verify magnetic running center of the shaft so placement of the shaft position can be done when coupling to the gear box. Electrical Testing will be carried out by Siemen's representative.

Equipment Name: - Pellet Dewatering Dryer
Tag No: - 42X84
Unit: - 42

1.Replace the Dryer screens.
2.Replace the Top & bottom Bearings & seals,
3.Replace inlet filter.
4.Inspect sprocket and replace belt.

Equipment Name: - Pellet Dewatering Dryer
Tag No: - 42X85
Unit: - 42

1.Replace the Dryer screens.
2.Replace the Top & bottom Bearings & seals,
3.Replace inlet filter.
4.Inspect sprocket and replace belt.

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LDPE SCOPE

Equipment Name: - Extruder
Tag No: - 43V80
Unit: - 43

1. Remove screw shafts for wear measurement.
2. Hydro blast polymer from screw shafts.
3. Unstack screw shaft elements for inspection for wear & Replacement (AWR) as recommended.
4. Verify spare screw timing using roll test before installing in barrels.
5. Clean elements and NDT splines for cracks.
6. Clean and NDT screw shaft for cracks.
7. Hydro blast barrels for inspection.
8. Measure barrel wear using COBRA instrumentation.
9. Replace 7 Barrels barrels & gaskets if required due to polymer leaks. (AWR)
10. Overhaul the screw shaft seal if worn, replace the sealing set.
11. Check all heating and cooling connection piping and valves.
12. Check the instruments, N2 control unit of Meco seals.
13. Chemical cleaning by Acid flushing all barrel sections.
14. Perform leak test for cooling and heating circuits.
15. Replace Meco seals.
16. Grease the screw shaft couplings.

Equipment Name: - Extruder Startup valve DAV - 43A404
Tag No: - 43DAV
Unit: - 43

1. Remove DAV plug and clean excessive polymer leak.
2. Remove DAV/SUV housing for screw removal.
3. Replace hydraulic cylinder.
4. Hydro blast DAV to remove degraded polymer.

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Equipment Name: - Screen pack changers
Tag No: - 43A405
Unit: - 43

1. Remove screen changer housing for screw removal.
2. Remove sliders to clean and lubricate.
3. Hydro blast S/C after removal to remove degraded polymer.
4. Replacement of screen elements (independent from shut-down activity).
5. Drain hydraulic fluid from cylinders.
6. Disconnect Hydraulic oil supply and return hoses.
7. Replace hydraulic oil hoses.

Equipment Name: - SPC/DAV Hydraulic system
Tag No: - 43T90
Unit: - 43

Change the Hydraulic oil.

Equipment Name: - 43A409 - Die-plate
Tag No: - 43A409
Unit: - 43

To Replace on insulation ring bolts on die plate Replace die-plate

Equipment Name: - Pelletizer
Tag No: - 43A410
Unit: -43

1. Replace O-Ring at pelletizer water box.
2.Check and repair sealing face of water box.
3. Replace all bearings, seals, and O-rings of the knife shaft bearing assembiy.
4. Replace the distance bushing for angular contact bearings on shaft.
5. Knife adjustment: Check hydraulic cylinders for leakage.
6. Replace springs and O-Rings of docking pins.
7. Replace docking pin and docking cylinders on the pelletizer.
8.Check of cardan-shaft for backlash and re-lubrication. If required replace.
9. Replace coupling insert between motor and gearbox.
10. Replace of hydraulic oil filter.

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11. Change hydraulic oil.
12. Replace pumps. (Refer to SPCo-SP-2507 and 2508)-to be done by S-chem Team
13. Pelletizer movement: Check hydraulic cylinder for leakage.
14. Replace the gearbox bearings and inspect the gears and shafts and replace the seal.
15. Replace the Motor Bearings.

Equipment Name: - Pelletizer hydraulic oil system
Tag No: - 43T85
Unit: - 43

1.Change the Hydraulic oil

Equipment Name: - SPC (Screen Pack Changer)
Tag No: - 43X80
Unit: - 43

Need to Fix Polymer Leak from Screen Pack Changer Side.

Equipment Name: - Die Head Housing
Tag No: - 43A408
Unit: - 43

1. Remove Die Head Housing.
2. Clean (Hydro jetting) and inspect.

Equipment Name: - Extruder gearbox
Tag No: - 43A203
Unit: - 43

1. Remove all gears shafts for bearing replacement and inspection of gears.
2. Check function of lubrication system to bearings and gear.
3. Change oil and filters.
4. Replace superposition drive backstop.
5. Replace all bearings, seals, and rotary union.
6. Verify timing of shafts.
7. Inspect lube oil piping for cracks.
8. NDT shaft and gears.
9.Inspect the Desch coupling.

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10.Replace Desch coupling bolts.
11. Replace Desch coupling flexible elements (buffer).
12.Inspect / replace Friction unit.

Equipment Name: - Gearbox
Tag No: - 43X80 - V80
Unit: - 43

Three bolts on the gearbox need to be repaired. Rotating Reliability engineer and Coperion vendor will have to determine the type of repair necessary.

Equipment Name: - Extruder Motor
Tag No: - 43XM80
Unit: - 43

Solo run the motor and verify magnetic running center of the shaft so placement of the shaft position can be done when coupling to the gear box. Electrical Testing will be carried out by Siemen's representative.

Equipment Name: - Pellet Dewatering Dryer
Tag No: - 43X84
Unit: - 43

1.Replace the Dryer screens.
2.Replace the Top & bottom Bearings & seals,
3.Replace inlet filter.
4.Inspect sprocket and replace belt.

Equipment Name: - Pellet Dewatering Dryer
Tag No: - 43X85
Unit: - 43

1.Replace the Dryer screens.
2.Replace the Top & bottom Bearings & seals,
3.Replace inlet filter.
4.Inspect sprocket and replace belt.

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PP SCOPE

Equipment Name: - 44V80- Extruder Die Plate (A409)
Tag No: - 44X80
Unit: - 44

1. Replace Die Plate
2. Removed die need to send to Coperion WS for overhauling.

Equipment Name: - 44V80- Pelletizer
Tag No: - 44A410
Unit: - 44

1. Replace O-Ring at pelletizer water box.
2. Check and repair sealing face of water box.
3. Replace Pelletizer Knife Shaft Assembly with Warehouse stock.
4. Removed Pelletizer Knife Shaft Assembly Need to Be Overhauled (Replace all bearings, seals, and O-rings of the knife shaft bearing assembly, Replace the distance bushing for angular contact bearings on shaft)
5. Knife adjustment: Check hydraulic cylinders for leakage.
6. Replace springs and O-Rings of docking pins.
7. Replace docking pin and docking cylinders on the pelletizer.
8. Check of cardan-shaft for backlash and re-lubrication. If required replace.
9. Replace of hydraulic oil filter.
10. Change hydraulic oil.
11. Pelletizer movement: Check hydraulic cylinder for leakage:

Equipment Name: - 44V80- Throttle Valve
Tag No: - 44X92
Unit: - 44

1. Remove DAV plug and clean the excessive polymer leak.
2. Remove DAV/SUV housing for screw removal.
3. Replace hydraulic cylinder.
4. Hydro blast DAV to remove degraded polymer.

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Equipment Name: - 44V80- Start Up Valve (DAV)
Tag No: - 44X93
Unit: - 44

1. Remove DAV plug to clean the excessive polymer and inspection.
2. Remove DAV/SUV housing for screw removal.
3. Replace hydraulic cylinder soft kits.
4. Hydro blast DAV to remove degraded polymer.

Equipment Name: - 44V80- Screen Pack Changer A
Tag No: - 44X94A
Unit: - 44

1. Drain hydraulic fluid from cylinders.
2. Disconnect Hydraulic oil supply and return hoses.
3. Remove screen changer housing for screw removal.
4. Hydro blast S/C after removal to remove degraded polymer.
5. Remove sliders to clean and lubricate.
6. Replacement of screen elements.
7. Replace hydraulic oil hoses.

Equipment Name: - 44V80- Screen Pack Changer B
Tag No: - 44X94B
Unit: - 44

1. Drain hydraulic fluid from cylinders.
2. Disconnect Hydraulic oil supply and return hoses.
3. Remove screen changer housing for screw removal.
4. Hydro blast S/C after removal to remove degraded polymer.
5. Remove sliders to clean and lubricate.
6. Replacement of screen elements (independent from shutdown activity).
7. Replace hydraulic oil hoses.

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Equipment Name: - 44V80- Extruder (Zone/Barrels)
Tag No: - 44X80
Unit: - 44

1. Disconnect/Connect Barrel Cooling Water (BCW) supply and return connections from/to the barrels.
2. Disconnect/Connect HP steam supply and condensate return connections from/to the barrels.
3. Remove screw shafts for wear measurement.
4. Hydro blast polymer from screw shafts.
5. Unstack screw shaft elements for replacement due to wear.
6. Verify spare screw timing using roll test before installing in barrels. 6a; Screw & Elements would be available for replacement and if required , these would be replaced.(AWR)
7. Clean elements and NDT splines for cracks.
8. Clean and NDT screw shaft for cracks.
9. Remove barrels and Hydro blast for inspection. Kindly confirm whether required leak test for barrel. (It will be evaluated after the barrels inspection as per rotation equipment department comment) 9a. Barrels 2 to 9 is recommended for Replacement. (AWR)
10. Measure barrel wear using COBRA instrumentation.
11. Overhaul the screw shaft seal if worn, replace the sealing set.
12.Replace barrels gaskets.
13. Check all heating and cooling connection piping and valves.
14. Check the instruments, N2 control unit of Meco seals.
15. Acid (Chemical Cleaning) flush all barrel sections by third party support. (Please refer the line item # SPCo-SP-2651) .
16. Replace Meco seals.
17. Grease the screw shaft couplings.

Equipment Name: - 44V80- Die Head Housing Zone
Tag No: - 44A408
Unit: - 44

1. Remove Die Head Housing.
2. Inspect and Clean (Hydro jetting).

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Equipment Name: - 44V80- Pelletizer Hydraulic Oil Tank
Tag No: - 44T85
Unit: - 44

1. Change the Hydraulic oil.
2. Tank Cleaning.
3. Suction screen/ strainer cleaning.

Equipment Name: - 44V80- Extruder Gear Box
Tag No: - 44A203
Unit: - 44

1. Remove all gears shafts for bearing replacement and inspection of gears.
2. Check function of lubrication system to bearings and gear.
3. Change oil.
4. Replace Auxiliary drive backstop.
5. Replace all bearings, seals, and rotary union.
6. Verify timing of shafts.
7. Inspect lube oil piping for cracks.
8. NDT shaft and gears.
9. Inspect the Desch coupling.
10. Replace Desch coupling bolts.
11. Replace Desch coupling flexible elements (buffer)
12. Inspect / replace Friction unit.

Equipment Name: - Extruder Motor
Tag No: - 44XM80
Unit: - 44

solo run the motor and verify magnetic running center of the shaft so placement of the shaft position can be done when coupling to the gear box. Electrical Testing will be carried out by Siemen's representative.

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Equipment Name: - 44V84- Pellet Dewatering Dryer
Tag No: - 44X84
Unit: - 44

1. Replace the Top & bottom Bearings.
2. Replace the seals, inlet filter
3. Inspect the rotor assembly
4. Replace Belt.
5. Inspect the Sprocket
6. Inspect the screen and replaced if required. (With warehouse stock)

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SECTION 4: MISSION STATEMENT

1. Initiate the Company's Policy for the control of injury, property damage, and fire.
2. Administer the policy himself or appoint a senior member of staff to do so.
3. Know Client safety requirements and the relevant parts of Saudi Government Workmen's regulations, and ensure they are observed.
4. Ensure that all Supervisors are qualified and that they receive adequate and appropriate safety training.
5. Make sure that in tendering planning stage and throughout the contract, allowance is made for suitable and sufficient equipment to enable the jobs to be done with minimum risk.
6. Coordinate safety activities between Client, Subcontractors and any other individual contractors who may be working in the same site.
7. Institute proper system for investigation, reporting and estimating the cost of injury, property damage or fire loss. Initiate analysis to discover accident trends and promote action to prevent recurrence.
8. Reprimand any Supervisor for failing to discharge satisfactorily the responsibility allocated to him.
9. Ensure that a formal hazard assessment plan is prepared in order to identify and correct hazards, which may be encountered during Turnaround.

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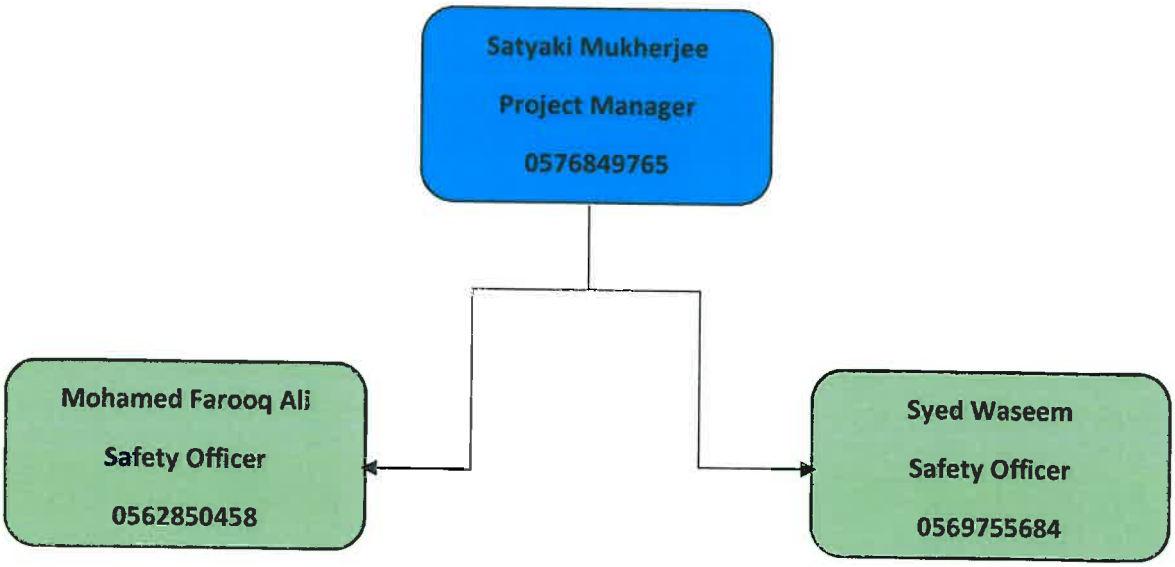
SECTION 5: ORGANIZATIONAL CHART



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SECTION 6: EMERGENCY COMMUNICATION CHANNEL

EMERGENCY COMMUNICATION CHANNEL

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SECTION 7: SECURITY RULES AWARENESS

Gas Arabian Service are committed to follow Security Policy, Rules and Regulation on all Government and Private sector, SABIC, ARAMCO affiliates and Subsidiaries.

Gas Arabian employees adhere to follow Safety Orientation programs as required on all Government and Private sector/SABIC/ ARAMCO/ before entering or working inside the plant premises.

The following are some of the security procedures that are being practiced on daily basis:

- Only Immunized personnel having 1st or second dose vaccine are allowed to enter inside the plant.
- Provide a proof of copies on any vaccine Health Passport or Medical Report record as to be shown at security gate(if requires)
- ID shall be shown at all time.
- ID shall be used for Entrance & Exit from plant.

- Drinking Alcohol is prohibited.

- Lighters and matches are not allowed.

- Mobile and electronic gadgets are not allowed inside plant.
- Use of Camera not allowed without photograph permit.

- Not allowed to take any material from plant site without approval gate pass.

- All the drivers & assistance drivers shall have Id entrance at plant site.
- Any prohibited material & unauthorized person entrance to plant side are not allowed
- Without proper PPE's are not allowed in the site.

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SECTION 8: LIFE SAVING RULES (L.S.R)

Life Saving Rules system used in industry to mitigate risk and prevent fatalities. The benefit from LSR to providing clear, simple and consistent communication regarding risks in the workplace and the proper use of barriers and safeguards to protect the workforce.

Each Life Saving Rule descriptive with additional detailed guidance to explain why the Rule is important and what aspects from Auditors, workers and supervisors to focus on.

Gas Arabian services will adhere to follow the LIFE SAVING RULES (L.S.R) procedures of S-CHEM plant:

- WORK PERMIT SYSTEM
- ENERGY ISOLATION
- DISABLING SAFETY SYSTEMS
- CONFINED SPACE
- WORKING AT HEIGHTS
- IGNITION SOURCE
- LIFTING OPERATIONS
- VEHICLES SAFETY
- COVID-19

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SECTION 9: DISCIPLINARY ACTION PROCEDURE

General Rules

This section presents general rules and regulations that have been established on the project to provide a safe and healthy working environment.

Rules of Conduct

All employees are required to conform to all rules of conduct relating to safety and health on the project. It is their obligation to understand and strictly follow the Gas Arabia Services minimum safety rules.

Personal Conduct

All employees shall observe the following prohibitions:

1. Indulgence in practical jokes, horseplay, scuffling, wrestling, boxing or fighting is forbidden.
2. Destroying or tampering safety devices, signs and equipment, willfully or unnecessarily discharging fire-fighting devices is prohibited.
3. Sleeping in work locations is prohibited.
4. Workers shall report to work in a fit and proper condition to perform their job in a safe
5. And competent manner. No worker shall enter the worksite under the influence of alcohol or drugs.
6. Use of such items in the worksites shall cause for immediate dismissal and permanent removal from the project.

Safety Discipline

Gas Arabian Services has implemented the following three steps disciplinary system when safety rules are not followed or other unsafe actions endanger workers.

- **First Offence**: Written disciplinary action
- **Second Offence**: Written letter; GAS HSE Department; Copy for file or Personnel Office
- **Third Offence**: Permanent Dismissal

Zero Tolerance Violations: Some safety violations are of such serious nature that there will be no warnings and termination may result. Examples include:

10. Entering hazardous confined spaces without following proper procedures.
11. Failure to use fall protective equipment protection
12. Entering unsafe excavations and trenches
13. Authorizing an activity without Permit to Work System

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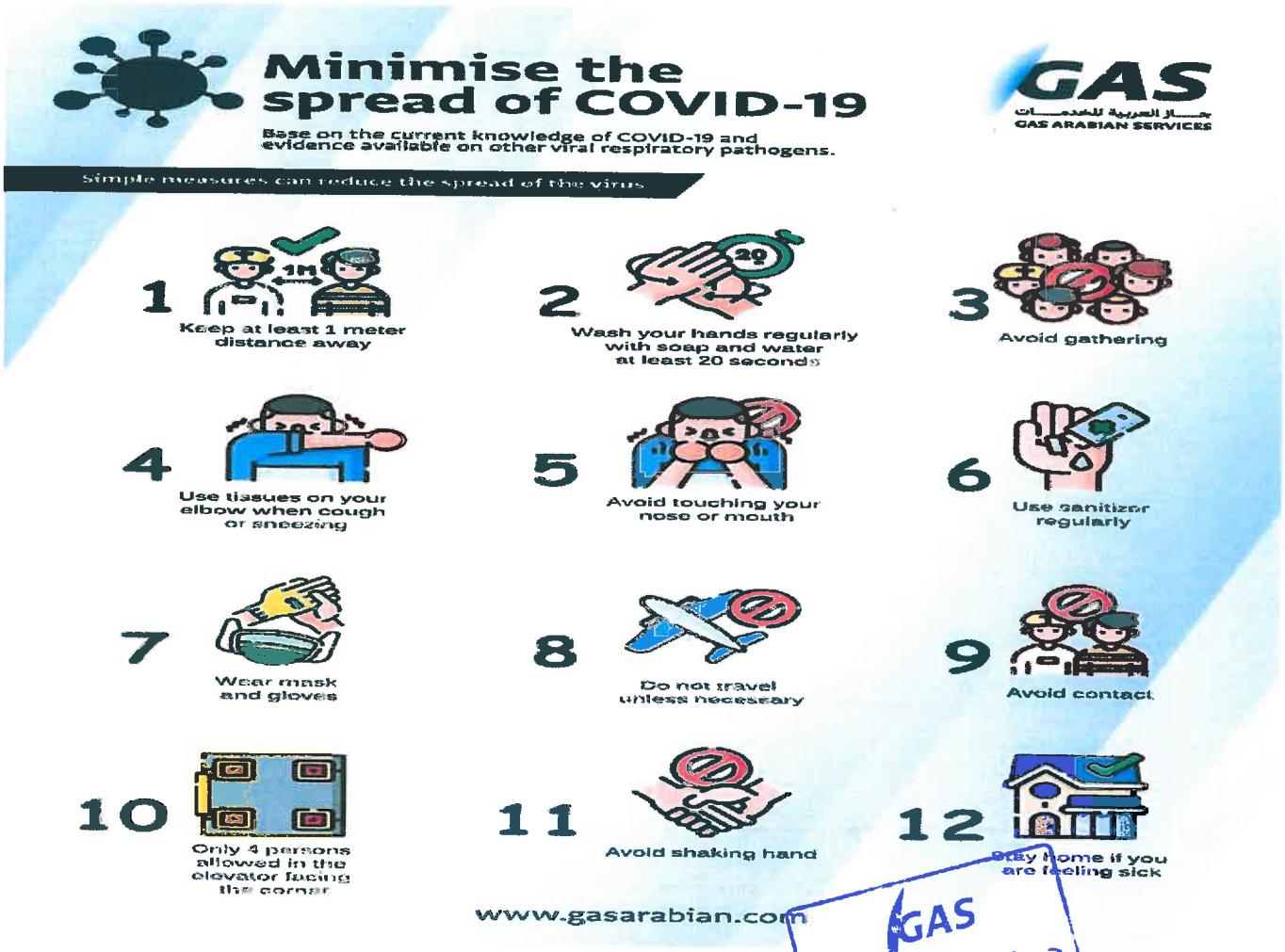
SECTION 10: COVID -19 PRECAUTIONARY MEASURES

COVID-19 RESPONSE



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Camp Main Residence (Employees Room)

- It is mandatory that all GAS employees must be immunized by having 1st or second dose vaccine approved by M.O.H.
- All employees going inside and outside of the Camp Main Residence shall undergo a Thermal Scanning and recording for contact tracing.
- Ensure to maintain a social distance of minimum 1 meter with no handshakes, no hugging, and no horseplay.
- Rooms must be cleaned, and sanitized daily and hand sanitizer must be provided at the entrance of each room.
- Residents must shower at least twice a day. Before and after.
- Toilet and washroom hygiene shall be improved with daily cleaning by using disinfectants.

THERMAL SCANNING POINT

MANDATORY THERMAL SCANNING

- Coordinate with Royal Commission & MOH regarding COVID-19 status changes.
- Posting daily information sheets and posters regarding the spread and symptoms of COVID-19, personal hygiene, kitchen hygiene, and prevention practices.
- Posting information sheets regarding contact number of the Camp Boss, in case of any possible infection case and or need for ambulance services or vehicle going to clinic.
- Posting information sheets regarding food supply, water, vitamins, medicine and recharge cards.
- Disinfectant of high traffic areas like Doorknobs, Faucets and Handrail twice a day.
- Ensure all employees showing flu like symptoms are sent to the medical clinic.
- local and regional guidelines.
- Workers shall also be made aware of the day-to-day government notification about COVID-19. E.g., Curfew timings, travel restrictions and others.
- Monitor workers with flu like symptoms. Workers who developed flu like symptoms shall be transported to Hospital.
- Any worker returning from abroad / provinces and cities shall be made to complete a quarantine period of 14 days before deploying on site or returning to the Camp Main Residence as per the instructions from M.O.H.
- Ensure to mount hand sanitizer stations in main access door of Camps and common areas.
- When inside of the camp residence, ensure to eat inside in their own room, rather than eating in a group in a common area.
- Ensure to ban the using of communal cup attach to the water dispenser. Provide a disposable drinking plastic cups in every water dispenser or provide a disposable bottled drinking water.

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Camp Quarantine Facility

- **Quarantine** separates and restricts the movement of people who were exposed to a contagious disease to see if they become sick. These people may have been exposed to a disease and do not know it, or they may have the disease but do not show symptoms.
- Any worker records body temperature more than 37.5 degree centigrade shall be monitored and when there is reasonable ground to believe that he has symptoms he will be transferred to a CAMP QUARANTINE FACILITY as per instruction from M.O.H
- Posting information sheets and posters regarding the spread and symptoms of COVID-19, personal hygiene, kitchen hygiene, and prevention practices.
- Posting information sheets regarding contact number in case for ambulance services.
- Posting information sheets regarding food supply, water, vitamins, medicine and recharge cards.
- Rooms must be cleaned, and sanitized daily and hand sanitizer must be provided at the entrance of each room.
- Disinfectant of high traffic areas like Doorknobs, Faucets and Handrail twice a day.
- End quarantine for residents 15 days after the case is discovered after complete confirmation by management.
- Monitor workers with flu like symptoms. Workers who developed flu like symptoms shall be transported to Hospital.
- Ensure to mount hand sanitizer stations in main access door of Camps and common areas.

Camp Isolating Facility

- **Isolation** separates sick people with a contagious disease from people who are not sick.
- Any worker who has been medically proven of having positive result after swab testing shall be send to CAMP ISOLATION FACILITY as per instruction from M.O.H.
- Rooms must be cleaned, and sanitized daily and hand sanitizer must be provided at the entrance of each room.
- Toilet and washroom hygiene shall be improved with daily cleaning by using disinfectants.
- Coordinate with Royal Commission & MOH regarding COVID-19 status changes.
- Posting daily information sheets and posters regarding the spread and symptoms of COVID-19, personal hygiene, kitchen hygiene, and prevention practices.
- Posting information sheets regarding contact number in case for ambulance services.
- Posting information sheets regarding food supply, water, vitamins, medicine and recharge cards.
- Disinfectant of high traffic areas like Doorknobs, Faucets and Handrail twice a day.
- Food supply is delivery by means of packed meals and drinks.
- Ensure to mount hand sanitizer stations in main access door Camps and common areas.

Site Mess Hall

- Ensure the employees take their breaks alternate schedule lunch break to lessen the people gathering and occupying the common dining table and chair.
- Ensure to wipe and clean the tables and chairs after use.
- Posting daily information sheets and posters regarding the spread and symptoms of COVID-19, personal hygiene, kitchen hygiene, and prevention practices.
- Disinfectant of high traffic areas like Doorknobs, Dining table and chairs, maintaining in a continuous process.
- Ensure to mount hand sanitizer stations in main access door of Mess Hall.
- Ensure the employees take their breaks alternate schedule lunch break to lessen the people occupying the Site Mess Hall/ Canteen.

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- Ensure the chairs are maintained 1 meter distance gap or as far as reasonably practical to each employee whether in Mess hall or Site Office.
- Ensure to ban the using of communal cup attach to the water dispenser. Provide a disposable drinking plastic cups in every water dispenser or provide a disposable bottled drinking water.

Site Toilet Cabin

- Toilet and washroom hygiene shall be improved with daily cleaning by using disinfectants.
- Ensuring toilet bowl and sink are cleaned and water & soap are available.
- Disinfectant of high traffic areas like Doorknobs, Faucet, Lavatory Sinks, Toilet Bowl, Urinating Bowl, maintaining in a continuous process.
- Ensure to mount hand sanitizer stations in main access door of Toilet Cabin.

Site Facility Office

- Ensure the chairs are maintained 1-meter distance gap or as far as reasonably practical to each employee whether in Mess hall or Site Office.
- Ensure to wipe and clean the tables and chairs after use
- Ensure to post daily information sheets and posters regarding the spread and symptoms of COVID-19, personal hygiene, kitchen hygiene, update from MOH, wearing surgical mask and prevention practices.
- Ensure to mount hand sanitizer stations in main access door of Site Office.
- Ensure to disinfect of high traffic areas like doorknobs, faucet, staircase handrails, table, chairs, water dispenser, cook tops and washing machines.
- Ensure to ban the using of communal cup attach to the water dispenser. Provide a disposable drinking plastic cups in every water dispenser or provide a disposable bottled drinking water.

Site Tool Box Meeting

- Training and toolbox talk to be delivered camp wide at least once a week (ES&H and all departments) – consider how this will be done without mass gatherings.

Site Smoking Area / Rest Shelter Area

- Site Smoking Area and Rest Shelter Area at site shall be constantly monitored to ensure social distancing is maintained and implemented as is required.

Site Working Area

- All Employees at site shall implement social distancing by maintaining 2-meter distance from each other during execution of work activities.
- If the employees cannot maintain a 1-meter social distancing during the executing of work activities due to its process requirement, the use of full-face shield and N95 mask will be an added protection. This is too slower and prevent inhaling the droplets of coronavirus from sneezing, coughing and exhaling of another person.
- All personnel at site shall follow all national, regional, local and Petrochemical Plant Guidance in respect of preventing the spread of Covid-19 at all times.
- Ensure to ban the using of communal cup attach to the water dispenser. Provide a disposable drinking plastic cups in every water dispenser or provide a disposable bottled drinking water.

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Vehicle Boarding:

- Only immunized employees having 1st or second dose vaccine can only board on the vehicle.
- Ensure the driver monitors a log sheet, to trace who will be on board of the vehicle.
- Ensure the driver controls the entry of employees wearing the mask. No mask and not wearing the mask properly shall not be allowed to enter the vehicle.
- Prior to entry of vehicle, the drivers shall ensure hand sanitizer soap and mask are available in the vehicle/ bus as a last resort.
- Driver shall ensure the 1 or 2 seat gap is in between of employees.
- Driver has the right and obligation to control the seating capacity and directing the occupants to vacate a seat to ensure a reasonable distancing.

Mask Usage:

- It is the obligation of the company to shoulder the cost and expenses of providing a surgical mask.
- Recycling of used surgical mask more than 12 hours is prohibited.
- The mask is given twice a day for employees who will work for duty.
- The company's coordinator representative issues individual boxes of surgical mask to each and every one residing in the camp and also including living outside the camp.
- Any mask found on the ground or floor of the vehicle and or camp shall be considered as contaminated which shall not be used for recycling.
- A surgical mask has two color, sky blue and white. Wearing the sky-blue color phasing outside means the employee is healthy. Wearing the white color phasing outside means employee doesn't want to infect others, meaning he is considered having a flu or similar.
- The used of a fabric mask is considered.
- The time to remove the surgical mask is when eating in the mess hall during a break time.

WEARING MASK IS MANDATORY INSIDE OFFICE PREMISES

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When social distancing cannot be followed in full at work site:

- Employees are provided and requires to wear N95 Mask or clear glass face shield.
- Employees are then mandated to make a 2-meter distance whenever he feels sneezy and coughing.
- Keeping the activity time involved as short as possible.
- Using back-to-back or side-to-side working (rather than face-to-face) whenever possible.
- Reducing the number of people each person has contact with by using 'fixed teams or partnering' (so each person works with only a few others.

Site Mitigation plan

- To maintain distance of minimum 1 meter with no handshakes, no hugging and no horseplay.
- Digital thermometer shall be provided for each site and kept with Site EHS officer for checking at different intervals.
- Liquid soap and water shall be available at all times.
- Disposable drinking cups shall be available and no shared water botties shall be allowed.
- Toilet and washroom hygiene shall be improved with daily cleaning by using disinfectants.
- All personnel working at site shall have to undergo the thermal reading for the purpose of checking and recording body temperature.
- Any worker records body temperature more than 37.5 degree centigrade shall be Isolated.
- All Employees at site shall implement social distancing by maintaining 1-meter distance from each other during execution of work activities.
- All personnel at site shall follow all national, regional and local guidance in respect of preventing the spread of Covid-19 at all times.
- Sufficient number of hand sanitizers, Masks and gloves shall be provided to personnel working at site.
- Site in charge shall appoint a responsible person to initiate the emergency action plan as required. The responsible focal person shall liaise with site in charge to ensure health and safety of workers at site.
- Continuous training, instruction and supervision shall be ensured at site to educate workers of all National, local and regional guidelines.
- Workers shall also be made aware of the day-to-day government notification about COVID-19. E.g., Curfew timings, travel restrictions and others.
- Inform all site personnel of emergency numbers in case of possible infection case.
- Training and toolbox to be delivered to all site workers. Consideration to be given to avoid mass gathering and enforcing 1-meter distance.
- Monitor workers with flu like symptoms. Workers who developed flu like symptoms shall be transported to Hospital.
- Allocating a dedicated vehicle and medical professional, including driver, to transport personnel to isolation rooms from site who show symptoms of COVID-19 but are not required to attend a hospital following advice from the government authorities
- Avoid non-essential social contact and complying with guidance on social distancing will help to reduce the spread of infection and allow people to continue their work.
- Verifying availability and appropriateness of PPE for all workers at site.
- Sterilizing the offices, welfare, housing units and other facilities three times a day, with continuous ventilation of buildings/portable office cabins.

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- Office cleaning equipment shall be color coded to segregate toilet cleaning equipment from office cleaning equipment.
- Dining shall be alternated to avoid mass gathering at one time.

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SECTION 11: SAFETY RESPONSIBILITIES & WORKER'S RIGHT

Project Manager Safety Commitment

- Understand the Company's Safety Policy and their responsibility allocated for them.
- Know the requirements relevant to Government Workmen's Regulations, and ensure they are observed.
- Provide written instructions to establish work methods, explain the sequence of operations, outline potential hazard at each stage and indicate precautions to be adopted.
- Monitor the affectivity of work methods and update any changes when necessary.
- Create Safety awareness by promoting Safety meetings, presentations, open forum discussions, and by implementing Safety training.
- Set personal example on site by wearing appropriate clothing and other safety protective equipment at all times.

Engineers and Supervisors Safety Commitment

- Organize the job site so that work is carried out in accordance to standard with minimum risk to men, equipment, and materials.
- Be familiar with Client Work Permit Procedures and requirements.
- Give precise instructions on responsibilities for correct work methods.
- Implement good housekeeping in the jobsite.
- Coordinate with sub-contractors and other contractors who may be working in the same site to avoid any confusion about areas of responsibility
- Ensure Equipment and Tools (both power and hand tools) are maintained in good operating condition.
- Make sure that suitable personal protective equipment is available and that is used.
- Release the foremen and craftsman when necessary, for Safety and Fire Training.
- Cooperate with the safety representative by doing their recommendations.

Safety Supervisor

- Report directly to the Project manager.
- To implement health safety & environment (HSE) rules, regulations and procedures by the company so as to protect it regularly from danger, damage and loss of life.
- To ensure and maintain proper HSE aspects for all people and properties of the company.
- To monitor, supervise and control the attendance and discipline of the HSE staff/ safety officer of the company.
- To ensure provision and installation fire extinguisher, directive boards/signs uniforms and personal protective equipment (PPE) tools are provided for protection and safety environment, and to ensure prevention of any danger accident and or fire incident.
- To follow-up/ update all new existing HSE rules and regulations and orders to obtain, maintain and submit all such information's together with all new developed equipment s/devices/tools related thereto as much as possible.
- To inform and advise the concerned management about any accident occurred at site.

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- To ensure that person under his control is adequately experienced or trained to enable them to carry out their duties.
- To ensure that corrective actions is taken where to meet budgets, quality standards and performance requirements.

Safety Officer

- Designated Safety Officer shall familiarize themselves with the health and safety program of client to ensure they are implemented during maintenance.
- Carry out site routine inspections to ensure that only safe work methods are adopted, health and safety requirements are implemented; welfare and first aid facilities are adequate and properly maintained.
- Determine the cause of any accident and recommend means of preventing reoccurrence.
- Supervise the recording and analysis of information on injuries and property damages, and fire. They will also assess accident trends and review overall safety performances.
- To assist in safety training to employees at all levels.
- Take part in discussions on injury, damage and loss control.
- Keep up-to-date with recommended codes of safety practices.
- Attend job progress meetings where safety is an item on the agenda.
- Report on job safety performances.
- Keep record of weekly safety meeting with the subject or topics discussed and a list of attendees.

Foremen

- Knowledgeable of Company's and Client's Safety policies;
- Conduct daily safety meetings at worksites.
- Maintains discipline on or off the job;
- Continuous monitoring of worksite activities;
- Directly deals with emergencies;
- Reports to the Site Engineer on conditions and follows through on instructions
- given;
- Maintains liaison with Project Engineer, Safety Officer and Site Engineer and/or Client Engineer in resolving safety issues;
- Investigates accidents/near misses;
- Render disciplinary actions where appropriate.

All Workers

- Strictly comply with the Company and Client's Safety Policies;
- Reports known hazards;
- Report's accidents/near miss;
- Report injuries;
- Be physically fit and mentally alert at all times;
- Operate equipment/vehicles only when authorized and licensed to do so;

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- Follow personal safety and conduct at all times on or off the job.
- Use the correct tools and equipment for the job. Use protective clothing and equipment provided.
- Do nothing to endanger self or workmates.
- Keep tools in good condition.
- Refrain from horseplay and fighting; avoid destroying or abusing safety devices, equipment, materials, and welfare facilities
- Report any accidents, near misses and hazardous conditions to immediate supervisor or foreman.
- Obey all posted warning sign.

On-site supervision of Gas Arabian Contractor employees and Safety Officer as ratio below:

1-20	One Supervisor	1-20	One Safety Officer
21-40	Two Supervisor	21-40	Two Safety Officer
41-60	Three Supervisors	41-60	Three Safety Officer

Employer's Responsibility to Health and Safety

1. To provide the safe place of work
2. To provide plant and equipment
3. To provide the safe system of work
4. To provide training
5. To provide supervision
6. To provide the competency of staff and workers

Worker's Responsibility to Health and Safety

1. Take reasonable care of their own safety and that of other people.
2. Comply with safety instructions and procedures
3. Use all safety equipment properly
4. Report any situation which they believe could be a hazard and which they cannot themselves correct.
5. Report any work-related accident, incident, near miss and ill health.

Worker's Right to Health and Safety

1. Given the right to adequate information on actions the employer has taken to ensure health and safety
2. Given the right to the necessary training in health and safety
3. Given the right to be consulted by the employer or its own representative on all matters in health and safety relating to their work.
4. Given the right to leave a workplace which has been reason to think presents an imminent and serious danger to his life or health and not be compelled to return until it is safe.

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SECTION 12: RISK MANAGEMENT PROGRAM & JOB SAFETY ANALYSIS

Purpose and Objective

- The purpose is to ensure that a Risk Assessment and Job safety analysis will be developed as a supplementary document as part of this Safety Plan. The content is the summary of all critical high-risk jobs hazards to be encountered on the job site and the steps to be followed in dealing with them.
- Prior to the start of each Turnaround activities, a hazard identification survey tour will be made in order identify possible hazards in a certain location, classify and enumerates safety guidelines to be followed in order to eliminate or at least minimize the hazards.
- To prevent accidents and cases of work-related ill-health and provide adequate control of health and safety risks arising from work activities.
- To provide adequate training to ensure employees are competent to do their work.
- To engage and consult with employees on day-to-day health and safety conditions and provide advice and supervision on occupational health.
- Ensure that all aspects of the risk management process are reviewed routinely.
- Ensure that risks themselves are subjected to review with appropriate frequency (with appropriate provision for management's own review of risks and for independent review/audit).
- Make provision for alerting the appropriate level of management to new risks or to changes in already identified risks so that the change can be appropriately addressed

Risk Management Program

GAS Arabian Services Project key personnel shall ensure that a Risk Assessment will be developed as a supplementary document as part of this HSE Plan. The content is the summary of possible hazards to be encountered on the job site and the steps to be followed in dealing with them.

Prior to start of each Turnaround activities, a hazard identification survey tour will be made in order to identify possible hazards in a certain location, classify and enumerates safety guidelines to be followed in order to eliminate or at least minimize the hazards.

Risk is the likelihood that likelihood that a hazard will cause harm together with its severity.
Hazard is something with the potential to cause harm.

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Hazard Categories:

1. **Physical (electricity, noise, vibration, radiation, machinery, mechanical, lifting)**
2. **Chemical (mercury, solvent vapor, carbon monoxide, acid mist)**
3. **Biological (coronavirus, bacteria, hepatitis)**
4. **Ergonomics (manual handling, repetitive task)**
5. **Psychological (stress, violence, bully)**

Risk Assessment

It is the determination of qualitative value of risk related to a concrete situation and a recognized threat.

Objective:

1. To prevent death and personal injury
2. To prevent other types of loss incident
3. To prevent breaches of statutory law which might lead to enforcement actions and or civil and criminal prosecution
4. To prevent the direct and indirect cost that follows on from accidents.

Five steps to Risk Assessment

1. Identify the hazard
2. Identify the people and who might be harm and how
3. Evaluate the risk and decide on precautions
4. Record the significant findings
5. Review and update as necessary

Evaluate the Risk

LIKELIHOOD	SEVERITY
1 = Extremely Unlikely	1 = Very Minor
2 = Unlikely	2 = First Aid Injury
3 = Possible	3 = Lost Time Injury
4 = Likely	4 = Hospital Treatment
5 = Very Possible	5 = Disabling Injury

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SEVERITY					
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5
	1	2	3	4	5
	LIKELIHOOD				

RISK RATING	ACTION & TIMESCALES	
15 and above	Unacceptable	Stop activity and make immediate improvement
9 to 14	Tolerable	Look to improve within specified timescale
5 to 8	Tolerable	Look to improve at next review
4 and below	Acceptable	No further action but ensure controls are maintained

Job Safety Analysis

A detailed Job Safety Analysis is produced to:

- To prevent accidents and cases of work-related ill-health and provide adequate control of health and safety hazards arising from work activities.
- Ensure that hazards are subjected to review with appropriate frequency (with appropriate provision for management's own review of risks and for independent review/audit).
- Make provision for alerting the appropriate level of management to new risks or to changes in already identified risks so that the change can be appropriately addressed.
- Job Safety Analysis shall be prepared to each scope critical high-risk activities and low risk activities.
- GAS Arabian Services Engineer / Supervisor team produced a detailed Job Safety Analysis and send to client for review and approval.
- Job Safety Analysis shall be attached together with work permit, discuss/explain to all project work force prior to start of any activity.

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Control of Hazard

A detailed Job Safety Analysis will be produced and submitted with every method of statement of every activity. The Job Safety Analysis would also be performed by the staff in accordance with the following general guidelines.

1. **Focus for Assessment**	A JSA is not a theoretical exercise. However, much work can be done on the paper from the knowledge you, employees or their representatives have of the workplace. A tour of the workplace will be needed to confirm, amend and add to your initial views.
2. **Identify Activities**	To identify all potential safety hazards in the workplace, you should first look at all activities that are carried out. Don't just look at the routine daily operations-consider all possible activities, including occasional maintenance and visits to the workplace.
3. **Identify Hazards**	Make a list of all hazards that are likely to occur for each activity. Ignore the trivial and concentrate on significant hazards. Consider hazards that may be associated with particular activities. - e.g., fire.
4. **Evaluate Hazards**	Evaluate the hazards from arising and decide whether the existing control safety measures are adequate or whether more should be done to get rid of the hazard or to control the risks.
5. **Review controls**	Look at the existing control measures that you have in place for each identified hazards and assess whether it is adequate and whether more could have to be done to improve their implementation. Consider whether new controls need to be introduced.
6. **Record decisions**	Produce a JOB SAFETY ANALYSIS report; record your findings and details of the action that you took as a result. Tell your employees about your findings by distributing or publishing your report. Prepare an emergency plan. Inform, instruct and train employees in Health and Safety procedures, including first aid.
7. **Review Regularly**	Keep the assessment under review and revise it when necessary. Any material change in processes equipment or manpower should prompt you to consider the need for a new job safety analysis.

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SAMPLE JOB SAFETY ANALYSIS			
Instrument Disconnection and Reconnection	JSA - Instrument Disconnection and I	**Electric Overhead Traveling Crane, Lifting, Slinging**	JSA - EOT Crane, Lifting, Slinging.doc
Blinding and De-blinding of Process Pipeline	JSA - Blinding and De-blinding of Proc	**Using Oxygen Acetylene Heating Torch for heating the bearing and hub.**	JSA - Using Oxygen Acetylene Torch for
Mobilization of Site Facility, Tool Container, Cabin Toilet, equipment and toolbox	JSA - Moblization of Site Facility, Tool	**Air Compressor Generator**	JSA - (Sample) Air Compressor Genera
Mobile Crane, Lifting, Slinging, Rigging	JSA - (Sample)Mobile Crar	**Tower Light Generator**	JSA - (Sample) Tower Light Genera
Hydro Jetting Machine	JSA - (Sample) Hydrojetting.docx	**Generator Set**	JSA -(Sample) Generator Set.docx
Fork Lift	JSA - (Sample)Fork Lift.docx		
SAMPLE RISK ASSESSMENT			
Blinding in Process Pipeline	Risk Assessement - Blinding in process		

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SECTION 13: INCIDENT / ACCIDENT REPORTING & INVESTIGATION

Accident Investigation, Analysis and Reporting

Much is learned through experience. A thorough investigation and analysis of an accident can help to prevent future accidents. To learn by experience, however, means that a system for the retrieval of information must be set up and statistical records must be kept of injury, death and property damage. With such a system operational, information can be collected and analyzed to show accident patterns. The company can then emphasize those areas in which safety education and training is needed most.

GAS Arabian Services Company is responsible for reporting accidents to its client as required. GAS Project Manager shall be contacted during working hours or by dialing mobile phone even after working hours.
Emergency situations shall also be reported to client by dialing emergency number or by sending a messenger to the nearest main gate whichever is the fastest.
This section covers these reporting requirements and the principles behind accident investigation and analysis.

1. **Reporting Requirements**

   GAS Arabian Services Company shall ensure that an immediate oral report is made to client representative in the case of all:

   - Fatal injuries
   - Injuries requiring medical attention and /or results in lost time
   - Damage Company's plant or equipment
   - Damage to Client equipment or property
   - Fires
   - Near misses
   - Monthly Safety Report etc.

   For accidents involving Company employee fatalities, serious injury to two or more Company employees, or damage to client's equipment or property, a preliminary written report shall be submitted within 24 hours followed by a detailed written report submitted within three days.
   GAS shall use its standard form for internal reporting and format approved by client for transmittal. All of these reports will be maintained as a record and shall be available for inspection at all times. (See attached Incident/Accident Form).

   The detailed written report shall include personnel involve, plant/vehicle involve, date & time of incident, circumstances, witnesses' statements and descriptive photographs or sketch.

   In addition to the reports required above, GAS Arabian Services Company will keep a record of all injuries and our site nurse will maintain this record. Monthly summary reports will be submitted to client as part of monthly safety reports.

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2. **Accident Investigation**
   The point of an accident investigation is to prevent recurrence of similar accidents; to determine facts rather than to find faults.

3. **Responsibilities for Investigation**
   - Supervisor/Safety Representative
     The supervisor and/or safety representative shall carry out an immediate investigation of any accident that occurs within his area of responsibility. The preliminary accident report must be completed and submitted within 24 hours to GAS and client representative. A final report on the incident shall be submitted within three days detailing any additional information and corrective action needed.

   - Project Manager
     The project manager shall review all accident reports to ensure that all the necessary corrective action has been taken and that he has addressed any items that may require action on his part.

4. **Cases to be investigated**
   Incidents that result in property damage or serious injuries to personnel and hospitalization of two or more employees must be fully investigated and reported. Unless the real cause is known, the hazard cannot be controlled in the future. The near-miss incident is equally important from the point of view of prevention and should also be thoroughly investigated.

5. **Accident Investigation Guidelines**
   The scene of an accident must be left undisturbed until Government Affairs/Authorities, and the safety supervisor have conducted their investigation. In some cases, the accident site must be rendered safe so as not to contribute to further accidents. However, precautions shall be taken to keep the accident scene intact as much as possible, to assist local police in their investigation. The investigation should include, but not be limited to the following:
   - Questioning the man in-charge and finding out what was planned.
   - Finding out the injured man's job or the normal configuration and function of the damaged equipment or plant.
   - Questioning the injured man as soon as possible.
   - Questioning the witnesses separately as to what they actually saw, not what they think happened.
   - Study the equipment or plant layout and noting any signs of misuse.
   - Finding the explanation of any irregularities.
   - From the information obtained, establishing the reason why the "unplanned" events took over from those that were "planned".
   - Recommending items of corrective action and methods of implementing them to prevent the recurrence of the incident.
   - Making a sketch or drawing of the accident scene and supplement that with supporting photographs.

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6. **Accident Analysis**
   GAS will use nine main classifications to analyze industrial accidents. These should go through the following classifications and their breakdowns to determine which of these (if any) apply to the incidents in which they were involved. These records help to illustrate accident trends.

Reporting Procedures for all accidents, personnel injuries and casualties, damage, fires and all near misses will be implemented as follows:

- In the event of fatal accident, injury cases or incident, the Safety Engineer and the Site Supervisor will carry out a satisfactory investigation. This will be reported verbally immediately and followed by a written form within 24 hours using the preliminary Client accident/incident form.
- All events involving damage to GAS Arabian Services and client property, plant and equipment will be subjected to a written report.
- Incidents reported as "near misses" not resulting in injury or damage to equipment or material that could have potentially caused injury or damage will be reported in verbal and if requested be reported in a written report.
- All meeting held at a Supervisory level, to discuss safety matters, injury prevention and loss control practices will be recorded.
- Client Loss Prevention Requirements will be adhered to all matter concerning personnel injuries and accidents reporting.
- One copy of all the above mention written reports will be maintained in the site office for permanent record.
- Reporting Job-Related Injuries/Illness

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SECTION 14: EMPLOYEE PERFORMANCE EVALUATION SYSTEM

GAS Arabian Services Health and Safety Environment Performance Evaluation System aims to acknowledge employee achievements, support their personal and professional development, and motivate and empower them to perform their work safely and effectively. This is done by answering Yes or No.

No.	EMPLOYEE PERFORMANCE EVALUATION	Yes	No
COMMUNICATION:			
1	He listens and participate in toolbox talks and follows instructions.		
2	He shares his inputs related to Health Safety Environment issues that could to harm, accident, fire, damage to property, and occupational illness.		
3	He follows safety symbols/ safety signage posted on the workplace area.		
4	He disseminates important information to his co-workers, related to health, safety and environment instructions given to him.		
5	He discusses to his fellow co-workers on how to get involve in accident and how not to get involve in accident using the tools, equipment, body positioning, correct procedures of using tools and equipment.		
DEPENDABILITY:			
6	Prior to the start of work, he verifies for a valid work permit, follow job description and uses only the required tools/ equipment.		
7	During preparation, he chooses the required 110V rated capacity power tools and clear of any damage/ defects/ cuts/ splits on the insulation cables.		
8	During preparation, he secures the power tools / pneumatic tools with complete safety accessories attached such as wheel guard and handles for angle grinders, whiplash arrestor for pneumatic tools and air compressor machine. When there is a missing safety accessory, he will not use it and report it to his immediate supervisor.		
9	Prior to start of Hot work activity, he secures himself using the required Personal Protective Equipment as mentioned in the Hot work permit.		
10	Prior to start of Hot work activity, he ensures the environment is clear of flammable and combustible materials including the presence of flammable gas leaks, including the areas affected by the hot sludge and sparks, he also ensures the availability of a good condition fire extinguisher cylinders, fire blankets, and fire watcher.		
11	In the normal job, he wears the required personal protective equipment properly.		
12	In working at heights, prior to entry of scaffolding access, he checks signs of scaffold tag, ensuring he don't do entry when it is in Red Tag and inform co-worker for their awareness.		
13	In working at heights, he uses full body harness when he is going to a platform above 1.8 m and attach to a higher guard rail and inform his co-worker for their compliance upon entry.		
14	In working at heights, he set up ropes and uses tool bag / or tied the objects for shifting materials and power tools, to avoid carrying the power tools when ascending and descending to the ladder. This is to ensure 3-point contact is being followed.		

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15	In confined space, he ensures it has a valid work permit and gas tested is satisfactorily having a 20.0% oxygen, no other gases present including flammable liquids and vapors, carbon monoxide, carbon dioxide, hydrogen sulfide, benzene etc.		
16	Prior to confined space entry, he ensures the presence of hole watcher, horn, gas tester device and monitoring sheet, air intake ventilation and air exhaust ventilation and a 24V light.		
17	During confined space work, he communicates his observation that he believes could be a hazard or clear and present danger that could lead to harm or accident or collapse of people occupying the confined space and can decide to evacuate immediately.		
18	In lifting, he verifies for a valid work permit. And refuses to do lifting when there is no valid work permit.		
19	In lifting, he checks all lifting gears have a valid third-party certificate and ensure the lifting gears has no signs of cuts, splits, defects, deform.		
20	In lifting, he ensures the barricades has been establish to avoid unauthorized entry.		
21	In lifting, he uses tag lines to control the load.		
22	In lifting, he uses the correct rated capacity of lifting gears and arrange the sling to avoid twisting and to secure the load having a center of gravity.		
23	In lifting, when the crane boom is idle, while the sling is attached to the main hoist, he removes the shackles to prevent striking to each other.		
24	In lifting, he arranges the laydown of materials in a manner that it will not obstruct the walkways and traffic road way.		
25	In positioning the outrigger mat, he avoids to install the outrigger mat near the pit, unstable ground like manhole, wet clay, signs of the presence of underground utility, away from excavation edges.		
INITIATIVE:			
26	He maintains a good housekeeping.		
27	He arranges power tool cable, extension cables and material to prevent slip, trip and fall.		
28	He familiarizes himself regarding the nearest location of safety shower and eye wash stations		
29	He familiarizes himself regarding the location of assembly points.		
30	He participates in giving warning during safety information campaign of prior and during pressure testing (hydro testing & pneumatic testing)/ NDT testing		
31	He fixe and re-install safety signage that broke down and bring into normal position.		
32	He installs warning tapes and softeners in areas where there is sign of pinch points, lifting activities and hot work activity.		
33	He initiates cleaning and removing the stains of oil leaks on the ground pavement.		
34	He initiates to bring drinking water on site.		
35	He initiates to bring garbage plastic on site and dispose all industrial waste.		
36	He installs warning tapes and alert others about lifting and hot work activity.		
37	He uses the full-face shield when it cannot maintain the 1 meter distance due to job demand		

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COMMITMENT:			
38	He reports any kind of accidents/ incident/ near miss/ dangerous occurrence in his area of responsibility or other related workplace that could affect or bring harm to the team & co-worker.		
39	He uses the required personal protective equipment properly and assist others.		
40	He strictly follows Life Saving Rules of the SABIC Affiliates and Private Sector Plants.		
41	He follows COVID 19 Safety Precautions and social distancing.		

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SECTION 15: HSE RECOGNITION

HSE RECOGNITION BASED ON EMPLOYEE PERFORMANCE EVALUATION SYSTEM

The company chooses the best employees based on Employee Performance Evaluation System without violation and offenses against Life Saving Rules and will be recommended by the following person:

- Project Manager
- Site Supervisor
- Safety Officer
- Foremen
- Petrochemical Plant Representative

The recommended employee will be given a certificate of HSE Recognition and an Internet Recharge Card or a Regular Call Recharge Card or Gift Voucher.

APPENDIX 14 – CONTRACTORS SPONSORED HSE RECOGNITION PROGRAM

#	Event	Description	Frequency	Accountable Party	Event Approval	Selection Criteria	Type of Recognition
1	Safety Award of the Month Rank No. 1	Employee who delivers best safe work practices and zero LSC violations	Monthly	Contractor Project Mgr./ In charge	Contract Owner Dept. HSE Committee Chairman	Selection criteria as per SHEM 00.07a	SR 200 Gift Voucher + SR 200 Internet recharge card + Certificate of Recognition
2	Safety Award of the Month Rank No. 2	Employee who delivers best safe work practices and zero LSC violations	Monthly	Project Manager	Contract Owner Dept. HSE Committee Chairman	Selection criteria as per SHEM 00.07a	SR 100 Gift Voucher + SR 200 Internet recharge card + Certificate of Recognition
3	Safety Award of the Month Rank No. 3	Employee who delivers best safe work practices and zero LSC violations	Monthly	Project Manager	Contract Owner Dept. HSE Committee Chairman	Selection criteria as per SHEM 00.07a	SR 200 Internet recharge card + Certificate of Recognition

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The selection criteria for the individual employee's HSE performance and contribution recognition award i.e. Safe Man of the Month and Year shall include the following:

- Number of near miss reporting
- Contribution to improve HSE performance & proactive actions to prevent accidents
- Zero LSC Violations for the year/ month/ semi – monthly

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SECTION 16: HSE COMMUNICATION AND BULLETIN BOARD

Project Weekly Meeting

Weekly scheduled meeting will be carried out by GAS Arabian Services Project Manager in weekly basis together with the Project personnel, staff, and worker's representative. HSE matters shall be discussed including previous inspections and audits.

Monthly detailed HSE review meeting with GAS ARABIAN SERVICES.

A detailed review of HSE statistics and issues will be held with GAS ARABIAN SERVICES on monthly basis.

Daily/Weekly / Monthly Safety Reports

GAS Arabian Services shall furnish a copy to GAS ARABIAN SERVICES Daily/Weekly Report using controlled forms which include all related Health, Safety & Environment and all statistical reports including near misses, work related safety observations, permit system and man hours.

GAS Arabian Services shall submit to GAS ARABIAN SERVICES a detailed monthly Safety report using standard form. The content of the report shall include the accumulated man hours statistically, Lost Time Incident/Lost Time Accident/First Aid Incident and Cases/Lost Workdays/Medical Treatment Cases and Accomplishment report.

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SECTION 17: HSE AUDIT, HSE INSPECTION & HSE OBSERVATION

HSE inspection is an onsite walk through to identify potential hazards to occupants and a personnel and options for remedial action.

HSE Audit is the systematic, objective and critical evaluation of an organization's health and safety management system.

HSE AUDIT	HSE INSPECTION	HSE OBSERVATION
Examines Document	Check the workplace	Initial and on the spot
Examine Procedures	Check the record	Records the finding
Interview Workers	Usually quick	Investigate the scenario
Verifies Standard	Part of an Audit	Discuss Safety procedure
Can be a long process usually expensive	Lower Cost	Give immediate and practical solution
Requires a high level of competence	May only require basic competency	Basic competency

There are three methods to gather information during HSE audit

1. Paper Works – documents and records
2. Interviews – managers and workers
3. Observation – workplace, equipment, activities and behavior

Pre-Audit Preparations:

1. Timescale
2. Scope of the Audit
3. Area and extent of the audit
4. Who will be required?
5. What documentation will be required
6. Auditor competence
7. Time and resource for auditors

Typical information examined during an audit

1. Health and Safety Policy
2. Risk Assessment
3. Training Records
4. Minutes of Safety Committee meetings
5. Maintenance records
6. Record of monitoring activities

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7. Accident investigation reports and date
8. Emergency arrangement
9. Inspection reports from insurance companies
10. Regulator Visitors
11. Worker complaints

End of Audit

1. Verbal Feedback Session to managers and highlights of the audit
2. Written Report to Management regarding the findings, recommendation, priorities and timescales.

HSE Observation

It is a daily routine process of checking and spotting unsafe acts, unsafe condition and non-compliance. This is to correct and maintain the safety work procedures of a given task. It is done by reporting – open and close report on a daily basis and submitted to the Site in Charge and Safety Supervisor.

ACTIVITIES	PARTICIPANTS	FREQUENCY
HSE Observation	GAS ARABIAN SERVICES HSE Officer	Daily and every shift
HSE Inspections (Walk Thru)	SABIC Affiliate HSE Engineers/ Supervisor/ Officer GAS ARABIAN SERVICES HSE Officer	Weekly
HSE Audit	SABIC Affiliate OHSAS 18001 Certified Auditors SABIC Affiliate Safety Engineer	Monthly

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SECTION 18: HEAT STRESS

HEAT RELATED EMERGENCIES

Heat stress/Heat Exhaustion best describe as excessive exposure to heat and that may lead to a number of heat conditions such as prickly heat to a more threatening condition like heat exhaustion and heat stroke. Workers suffer from heat stress when the body absorbs more heat than it can dispel. Prompt action will avoid the serious or even fatal consequences of fully developed heat stroke.

Responsibilities

It is the responsibility of GAS project Safety personnel and Project Management to understand and deal with all type of heat stress. Safety personnel shall constantly monitor and consult SABIC AFFILIATE And Private Plants on the update temperature humidity level especially at summer working time and ensure to follow all restrictions and recommendations.

Prevention

- Provide a sufficient clean drinking water and water cooler dispenser with available plastic cups in Site Facility Office and Mess Hall.
- Provide a disposable bottled drinking water in work site, when the distance between the work site and Site Facility Office is impractical to walk and get exposed under the heat of the sunlight.
- Provision of rest shelter facilities with proper shading and roofing.
- First Aid equipment shall be readily available.
- Provide an Oral Rehydration Salts Powder available in Site Facility Office where extreme heat is present.

Heat Exhaustion

A serious health ill-ness which may progress to heat stroke and if not properly treated.

Symptoms

- Profuse sweating
- Cold, clammy pale skin
- Fatigue, weakness, and restlessness
- Headache
- Nausea and vomiting
- Weak, Rapid pulse

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- Normal temperature
- Faintness

Treatment

- Move person to a cool place, shady area and air-conditioned environment like Mess Hall Container, Site Facility Office and or First Aid Clinic that belongs to the SABIC affiliate and Private Sector Plants.
- Lay down the person and with legs slightly elevated and supported.
- Cool person with cold compress.
- Encourage to drink water.
- Massage muscles gently to prevent spasms or firmly cramped then apply cold pack.

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SECTION 19: ENVIRONMENTAL GUIDELINES FOR CONTRACTORS

Purpose

To provide minimum administrative requirements for maintaining a high standard of Environmental Management during the execution of work at all Government and Private sector, SABIC, ARAMCO AFFILIATES.

Scope

This procedure applies only to GAS Arabian Services while performing its scope of work under specific contract. This section covers Environmental and Sanitary standards applicable during the handling, treatment and disposal of liquid and solid waste generated during the execution of this project.

Responsibilities

1. **Project Manager:** The overall responsible for the implementation of waste management program.
2. **Site In-charge:** Implement guidelines and procedure specified in this program.
3. **Safety Supervisor:** To ensure and inspect that the overall implementation of this program are met during the entire duration of the contract.

Human Waste Management Program

- The company will appoint a qualified Environmental Coordinator to organize this program.
- The company will rent a Site Office Toilet Cabin with septic tank and water supply.
- The company will dispose liquid and solid wastes in compliance with approved Gas Arabian Services procedure and in compliance with Client's approved waste disposal are
- The company intends to utilize a sub-contractor, which is duly approved by client to administer its sewage disposal activities. Only sewage septic tank from the site office facilities and portable toilets will require disposal.
- The company will hire a sub-contractor that will provide a Super Sucker Truck to take all human waste from the septic tank.

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Domestic Waste Management Program

GAS Arabian Services Company "Waste Disposal Program" will include provisions for temporary site storage, Site Office, Mess Hall and Tool Room Container. This program shall comply with approved Gas Arabia Services Soli

- The company intends to utilize a sub-contractor using a skip bin waste container, which is duly approved by client to administer its disposal. This will be the main disposal container coming from the portable waste containers.
- The company provides a portable waste container for general waste like food waste and office waste which will be assigned in Tool Room Container, Office Cabin, Toilet Cabin and on site work area.

- The company will follow the client's procedures such as color coding of skip bin requirement for sharps, general waste, concrete, metals, and paints and other chemical cans or container.

Blast Proof Container Office and Mess Hall

- The company provides Blast Proof Site Office Cabin for the staff.
- It shall be equipped with good condition Air Condition machine, smoke detector, Air Filter, electricity and electrical outlet and Lights.

- Lunchroom Shelter or Welfare facilities on site shall be kept in a tidy and clean manner. Housekeeping will be imposed and that all wastes will be removed daily and disposed to an approved client and/or dumpsite.

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Tool Room Container

- The company provides a tool room container and tool box cabinet for hand tools, mechanical tools, power tools, pneumatic tools, heat induction equipment, disk, wire brush, manifold, lifting gears, lifting equipment, full body harness, warning tape, etc.

Smoking Shelter Area

- The company provides a designated smoking area for workers and staff.

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SECTION 20: HSE STATISTICS AND KEY PERFORMANCE INDEX

EHSS Statistics and computation of man-hours shall be submitted to GAS ARABIAN SERVICES HSE Section the end of the month.

SL/No.		2021
	PROJECT T/A DURATION:	
1	Total Man hours Worked	273,208
2	Fatalities/ Death	0
3	Number of Days Away from Work	0
4	Restricted to Transfer to Another Job	0
5	Medical Treatment beyond First Aid of Consciousness	0
6	Near Miss	0
7	Accident	0
8	Dangerous Occurrence	0
9	Occupational illness	0
10	Environmental Incident	0
11	Medical Treatment Cases	0
12	Motor vehicle Incidents	0
13	Recordable Loss Time Injury over 3 days	0
14	Recordable Loss Time Injury below 3 days	0
15	Number of Job Transfer or Restrictions	0
16	Frequency Rate= No of Accident Case X 1,000,000/Total Man Hours Worked	0
17	Lost Time Injury= No. of Injury X 100,000 / No. of Hours Worked	0
18	Severity Rate= No. of Days Lost X 1,000,000/ Hours Work	0

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"DETAILED TOTAL MANHOURS FOR VARIOUS PLANT PROJECT & T/A 2020-2021 "

SN	NAME OF PLANT	DAYS	MANPOWER	WORKING HOURS	TOTAL MAN HOURS:
1.	YANPET	16	56	12	10,752
2.	KEMYA	7	8	12	672
		15	10	12	1,800
		9	9	12	2,700
3.	IBN ZAHR	11	54	12	7,128
4.	YANPET (MM20)	12	34	12	4,896
		16	68	12	13,056
		27	60	12	19,440
		16	74	12	14,208
5.	SAUDI KAYAN (EXTRUDER L 1 &2)	17	6	12	1,224
6.	TASNEE (NEW MAIN EXTRUDER MOTOR)	6	14	12	1,008
7.	TASNEE (HYPER BOOSTER)	7	76	12	4,704
8.	YANPET	16	56	12	10,752
9.	SHARQ TAM 2020 PE 3& 4	24	133	12	38,304
10	AL-BAYRONI T/A 2019	2	37	12	88
		3	56	12	2,016
		20	88	12	21,120
		10	29	12	3,480
11	SIPCHEM T/A 2021	18	35	12	7,560
12	ADVANCE T/A 2021	25	156	12	46,800
13	TASNEE LDPE T/A 2021	20	111	12	26,640
14	YANPET (Extruder LINE 5 S/D) 2021	10	50	12	6,000
15	YANPET (Extruder LINE 1 & 2 S/D) 2021	18	45	12	9,720
16	KEMYA SHUTDOWN 2021	7	35	12	2,940
17	IBN ZAHR T/A 2021	27	50	12	16,200
				TOTAL MAN HOURS	273,208

KEY PERFORMANCE INDEX: ADVANCED PETROCHEMICAL CO. T/A MARCH 2021

Key Performance Index - FSD 2020.xls

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SECTION 21: CONTRACTOR QUALIFICATION PROGRAM

GAS Arabian Qualification Program is to provide fully integrated system that automates all GAS Arabian Services Project personnel which are fully qualified and competent that will result in greater efficiency, more accuracy, better quality regarding HSE and the optimum level of each task.

Rigger 1	Certified by a Third-Party Certification Company as Rigger 1
Rigger 2	Certified by a Third-Party Certification Company as Rigger 2
Rigger 3	Certified by a Third-Party Certification Company as Rigger 3
Lifting Supervisor	College degree, Vocational/ Training Certificate/ Rigger 2, HSE Officer, Site Engineer
Lifting Engineer	College degree – Mechanical Engineer, Physics, Rigger 1
Crane Operator/ Boom truck Operator/ Steer Skid Loader Operator/ Backhoe Loader Operator/ Hydraulic Excavator/ Forklift operator	Certified by a Third-Party Certification Company as Operator
Scaffolder	Certified by a Third-Party Certification Company as Scaffolder Erector
Scaffolder Inspector	Certified by a Third-Party Certification Company as Scaffolding Inspector/ HSE Officer
Fabricator	Vocational / Training Certificate
Fabricator Foremen	College Diploma – Mechanical Technology / Vocational / Training Certificate
TIG Welder/ Plate Welder	Welder Qualification Test & Vocational / Training Certificate
Welding Foremen	Welder Qualification Test & Vocational / Training Certificate
Welding Inspector	Certified by a American Welding Society or its equivalent as a Welding Inspector
Instrumentation & Electrician Technician	Vocational / Training Certificate
Electrical Supervisor	Vocational / Training Certificate / Electrical Technology Certificate
Instrumentation Engineer	College Diploma – Instrumentation and Control Engineer degree/ Electronics & Communication Engineering degree
Mechanical & Millwright Technician	Vocational / Training Certificate / College Diploma
Mechanical Engineer/ Supervisor	College Diploma – Mechanical Engineering/ State License

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Catholics Protection Technician	Vocational / Training Certificate/ Electrical Technology Certificate
Surveyor	College Diploma – Civil Engineer/ Geodetic Engineer
Civil foreman	Civil Technology
Iron Worker & Iron Foremen	Vocational / Training Certificate / Mechanical Technology
Site Engineer	College Diploma – Mechanical Engineering/ State License
HSE Officer / Supervisor	College Diploma and OSHA Certificate, IOSH Certificate, NEBOSH IGC Certificate
HSE/ Safety Engineer	College Diploma – Engineering degree and OSHA Certificate, IOSH Certificate, NEBOSH IGC Certificate
Safety Auditor / Consultant	College Diploma – Engineering degree and OSHA Certificate, IOSH certificate, OHSAS 18001 Lead Auditor Certificate
Pipe Fitter	Vocational / Training Certificate – Pipe Fitting
Piping Supervisor	Vocational / Training Certificate – Pipe Fitting
Piping Engineer	College Diploma – Mechanical Engineering degree, State License/ Piping Design (Auto-cad / Creo Parametric)
Hydro Test Supervisor/ Foreman	College Diploma – Mechanical Engineering degree/ Vocational / Training Certificate
Rotating Technician	Vocational/ Training Certificate/ Rigger 3
Rotating Engineer	College Diploma – Mechanical Engineering degree / Rigger 2 / Lifting Supervisor

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SECTION 22: LICENSE & CERTIFICATION

GAS Arabian Services Company will arrange for the qualification of vehicular/truck drivers, crane operators, riggers, scaffolders and heavy equipment operators.

Operator qualifications:

1. Only trained personnel are allowed to operate cranes and other mechanized equipment.
2. Operators are trained in the procedures and functions relevant to a specific piece of equipment
3. They are fully aware of the capabilities and limitations of the machine.
4. Have knowledge of the day-to-day maintenance requirements.
5. Familiar with the equipment's safe operating requirements.
6. Have knowledge of the limitation and limit of approach when operating near existing pipelines and power lines.

All drivers/operators shall be in possession of valid government driving license; these are categorized in two types: a) Light duty; b) Heavy duty. All Heavy equipment and crane operators shall be in possession of valid Saudi government license identifying the type of machinery he can operate. Crane and Heavy equipment operators assign in client restricted area shall be certified.

Certificates

GAS will train its employees to the satisfaction required by client in order to obtain proper certification in operating and performing job activities. Usual training and certification are applied to from a Third Party

1. Safety officers
2. Crane operators
3. Heavy equipment operators
4. Riggers
5. Work permit receivers
6. Scaffolding erectors
7. Scaffold supervisor II-S (system)
8. Scaffold supervisor II-T (tubular scaffold)
9. Scaffold supervisor I (System & Tubular)
10. Scaffold Inspector
11. Fire watchers
12. Gas detector operators
13. First aid applicator
14. Hazard recognition courses

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SECTION 23: RECOGNITION AWARDS FOR MAJOR SHUTDOWN /PROJECTS

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سافكو SAUDI ARABIAN FERTILIZER COMPANY
safco

This

Certificate of Recognition

is hereby awarded to

GAS ARABIA

for their outstanding performance and invaluable contribution during
SAFCO ALBAYRONI FERTILIZER T/A 2019

Given this 28th day of May 2019 in ALBAYRONI Plant.

YOUSEF ALNEMER
ROTATING EQUIPMENT ENGINEER

Appreciation Certificates-28.07.20 | KEMYA - February 2012.pdf | IBN-RUSH - 2012.pdf | IBN RUSHD CERTIFICATE.pdf | AR-RAZI - June to July, 2012.pdf | MAADEN COA.pdf

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البيروني albayroni

Certificate of Appreciation

Al-Bayroni

We hereby appreciate your involvement & efforts for the successful completion

Of

2-EH & DOP Turnaround Year 2011

GAS ARABIAN SERVICES CO. LTD.

Khalid A. Al- Ghamdi
T/A Section Head

Ahmed A. Al- Waili
Maintenance Manager

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البيروني albayroni

CERTIFICATE OF APPRECIATION

Gas Arabian Services Co. Ltd.

Abdulmajeed A. Al-Omani
General Manager
Technical Services & Maintenance Division

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ابن رشد
ibn rushd

سابك
sabic

الشركة العربية للألياف الصناعية (ابن رشد)

Arabian Industrial Fibers Co. (Ibn Rushd)

Certificate of Appreciation

is hereby granted to

Gas Arabian Services Co. Ltd.

(Manpower Division)

for their excellent performance during 2012 PTA T/A.

IBN RUSHD management highly appreciate Gas Arabian Services Co. Ltd. for the Safety, Health Environment and timely support extended during the period of the Turnaround activities.

We wish all the success for their future endeavors.

Hamdan. M. Al-Elyani
Manager, Turnaround

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SAUDI METHANOL COMPANY
Maintenance Planning Department

الرازي
Razi

Certificate of Appreciation

This certificate of appreciation is hereby given to:

GAS Arabian Services Co. Ltd.

(GAS Arabian)

for their contribution, effort and hardwork during the Plant-III Scheduled Turnaround. In behalf of ARRAZI senior management, we recognized your involvement and extends our deepest gratitude.

Job well done!

ABDULRAHMAN AL-HOMAID
Mechanical Planning Supervisor

HASAN A. AL-GHAMDI
Manager, Maintenance Planning
(STA Manager)

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سابك SABIC

الرازي AR RAZI

Certificate of Recognition

THIS CERTIFICATE IS AWARDED TO

GAS ARABIAN SERVICES CO., LTD.

For participating in the AR RAZI Plant-III STA activities from June 10, 2012 to July 25, 2012.

And in recognition of their tireless efforts, team work and effective administration of work place Safety during the STA period, which has contributed in achieving the tough STA target without any Loss Time Injury.

22/8/2012

Abdulrahman Al-Homaid
TA Section Head

August 28, 2012
Date

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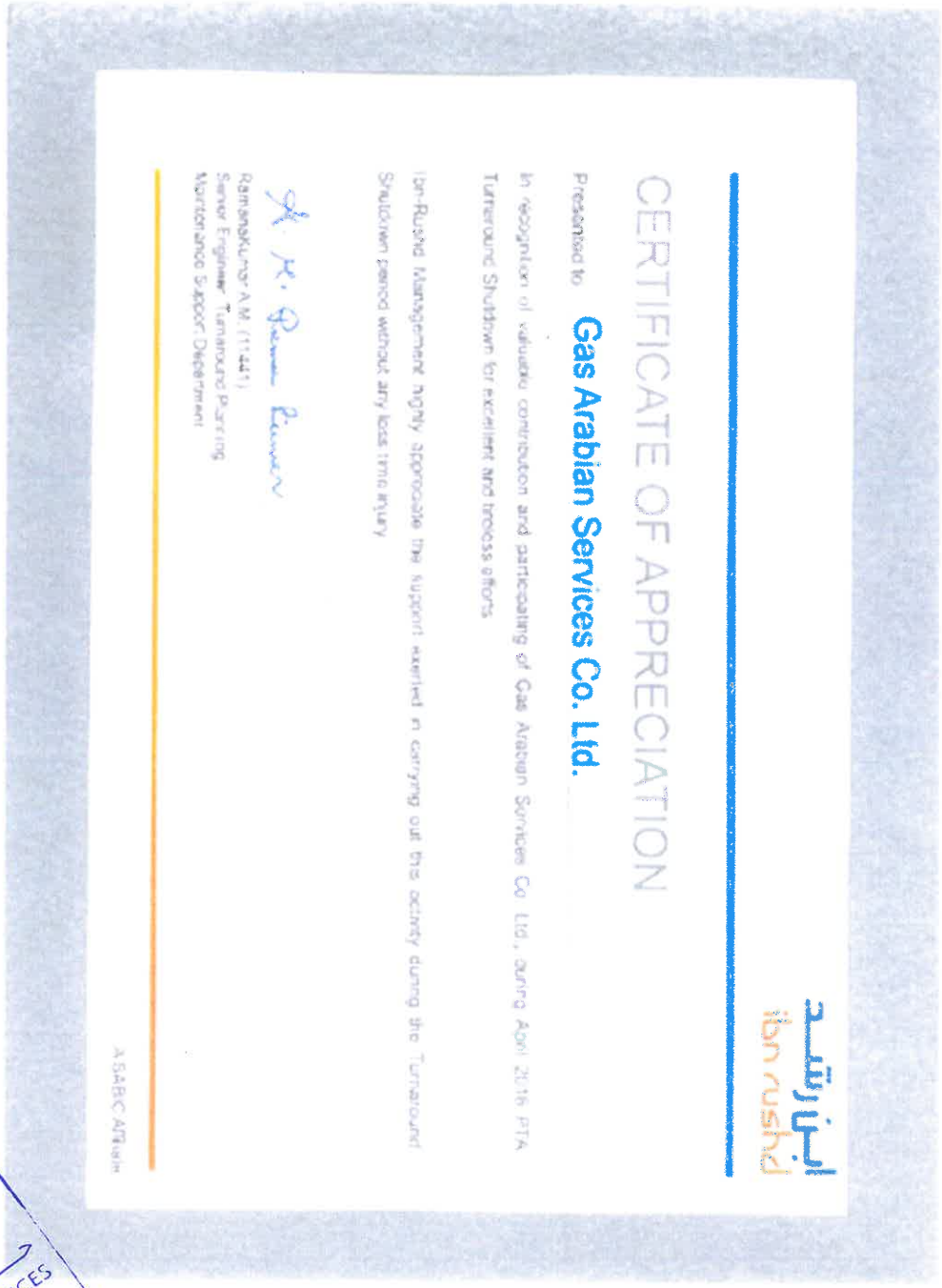

ابن رشد
ibn rushd

CERTIFICATE OF APPRECIATION

Presented to **Gas Arabian Services Co. Ltd.**

In recognition of valuable contribution and participating of Gas Arabian Services Co. Ltd., during April 2016 PTA Turnaround Shutdown for excellent and brilliant efforts

Ibn-Rushd Management highly appreciate the support exerted in carrying out this activity during the Turnaround Shutdown period without any loss time injury

Ramaswamy A.M. (11441)
Senior Engineer Turnaround Planning
Maintenance Support Department

A.SABIC Al-Rushd

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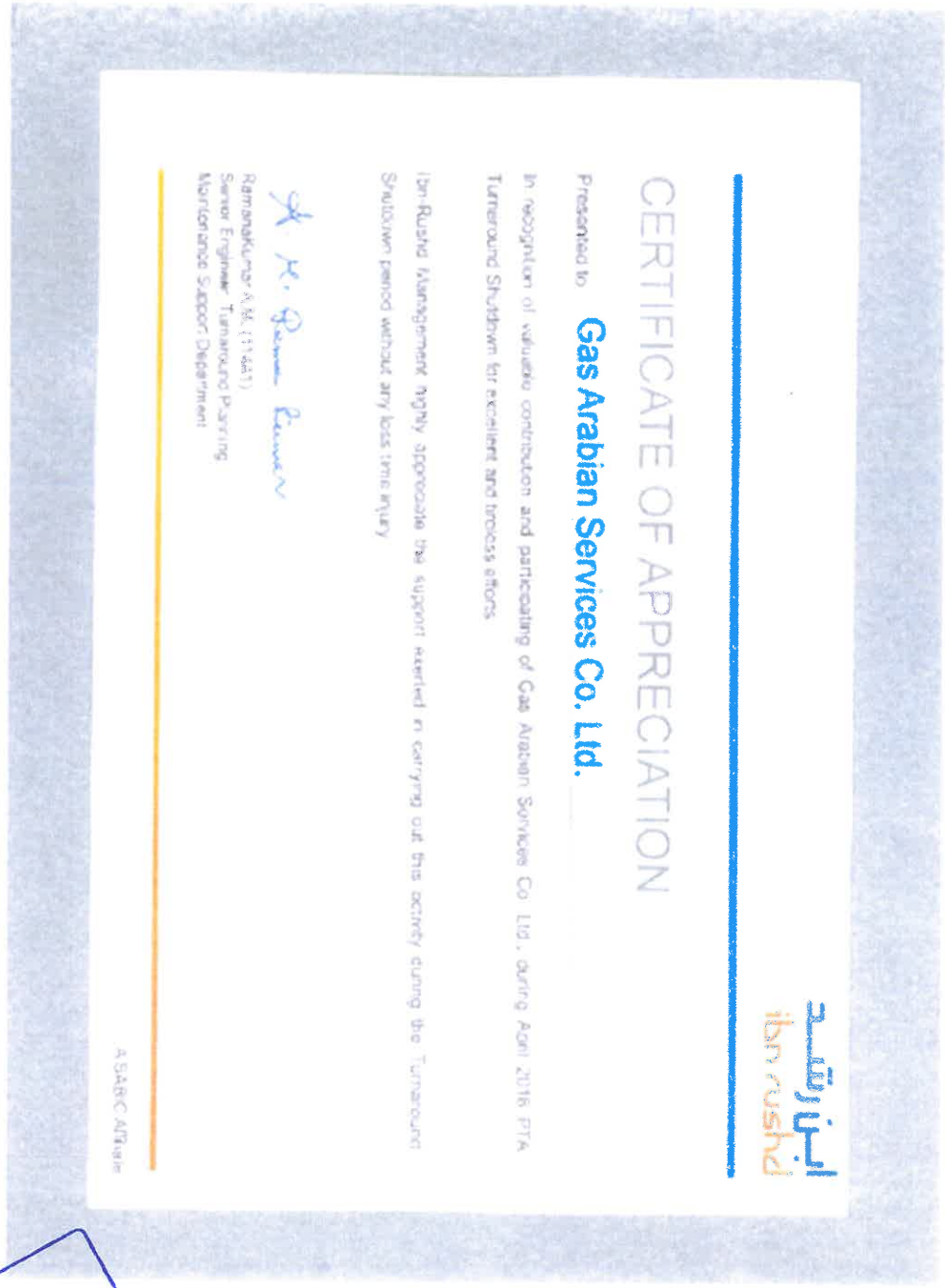

ابن رشد
ibn rushd

CERTIFICATE OF APPRECIATION

Presented to **Gas Arabian Services Co. Ltd.**

In recognition of valuable contribution and participating of Gas Arabian Services Co. Ltd., during April 2016 FTA Turnaround Shutdown for excellent and tireless efforts.

Ibn Rushd Management highly appreciate the support exerted in carrying out this activity during the Turnaround Shutdown period without any loss time injury.

Ramanakumar A.M. (1144)
Senior Engineer Turnaround Planning
Maintenance Support Department

A SABIC Affiliate

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Rotating Equipment

Environment Health and Safety Plan

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بتروكيميا
petrokemya

شهادة شكر وتقدير
Appreciation Certificate

منحت الى
Awarded to

GAS ARABIAN SERVICES

For an outstanding participation in successful completion of May 2012 Turnaround and excellent contribution in safety by carrying out activities without any injury.

التاريخ
Date 06 / June /2012

Amir Bin Rauf
Superintendent
Turnaround Maintenance Planning

Ali S. Al-Buwally
Manager
Maintenance Support Department

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AL-JUBAIL PETROCHEMICAL COMPANY

كيميا kemya

شركة الجبيل للبتروكيماويات

Certificate of Recognition

Awarded To

Gas Arabian Services

On behalf of the Polymer Mechanical Maintenance Management, I take this privilege to extend my deepest appreciation to you for safe and successful Kemya Plants 2012 Turnaround activities in February, 2012.

We would like to put on records that this achievement originates from your sincere attitude and dedication towards Kemya.

Keep up the good work!

ALI A. AL-KHALDI

SUPERINTENDENT - POLYMER MECHANICAL MAINTENANCE

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SECTION 24: PERMIT TO WORK SYSTEM

Aside from the authorities mentioned above there would be another WORK PERMIT requirement when working in Private Sector, SABIC or Saudi Aramco restricted areas. GAS will ensure that work permit shall be obtained prior to start work in compliance to Gas Arabia Services applicable standards.

Function

The Work Permit authorizes specific maintenance and inspection of repair work to be conducted in the Gas Arabia Services' restricted areas. The permit serves as an official written record of conditions and requirements agreed upon by the issuer and receiver. It lists the minimum safety precautions to be taken that hazards must be controlled.

Roles & Responsibilities:

Permit Issuer

- Must be a person who is trained, competent and authorized to **issue** a **Permit to Work** after ensuring that all of the hazards, associated with the work being done, have been identified and all necessary safety precautions are being implemented to ensure that the work can be completed safely.
- Supervising the work prescribe in the permit to work to ensure it is conducted in the most efficient manner
- Notifying the issuer of work progress and completion, and ensuring that the site is returned to a safe and operational state.
- Taking adequate care to preserve the permit in good condition.

Permit Receiver

- Must be a person who is trained, competent and authorized to receive a **Permit to Work.**
- Initiating and completing all applicable section of the permit to work.
- Supervising the work prescribe in the permit to work to ensure it is conducted in the most efficient manner.
- Notifying the issuer of work progress and completion, and ensuring that the site is returned to a safe and operational state.
- Taking adequate care to preserve the permit in good condition.
- Providing and arranging all necessary resources related with performing the work, including standby- man
- Confined space entry.
- Revalidation of work Permit.

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Most common permits issued in the job site are:

1. Cold work permit for activities that does not produce energy to ignite and only hand tools is use.
2. Hot work permit for activities that produces spark, heat, radiation, electrical and vehicle entry into restricted areas.
3. Confined space entry permit for activities that personnel are required to enter into tanks, vessel, sewers and excavations of four (4) feet deeper.

Restricted areas are those areas designated by Gas Arabia Services that require work permits. Those areas include refineries or processing plants, oil handling facilities, pipelines, power lines, radioactive and explosives handling areas.

Issuance and Inspection

The Certified Permit receiver must request a Work Permit from a certified issuer (Operations Supervisor) before doing any work in a restricted area. The issuer will grant the Work Permit after he has visited the site with the craftsman responsible and reviewed the hazards applicable to that particular job.

Precautions

Each permit contains a checklist of precautions against common hazards. Such a list cannot include a checklist that can take precautions against all hazards. It is the duty of both the issuer and the receiver to review the job, anticipate what hazards might arise, and see that the proper precautions have been specified on the permit before it is signed.

Handling of Issued Work Permits

A Work Permit is valid for only one shift but may be extended for one additional shift with proper approval. Exceptions is excess of 16 hours may be granted in special cases provided certain precautions are taken. The receiver of the permit must keep the permit on the job site at all times, ensure that the permit receiver is on site at all times or has with approval of the issuer temporarily delegated a qualified alternate to serve in his absence.

Closing Out and Filing the Permit

Either the issuer or the receiver can revoke a Work Permit. This must be done if a hazardous situation develops after work starts or if there is any change of circumstances likely to affect safe working conditions. When the work is completed and at the end of each day's work, both the issuer and receiver must close out each Work Permit. The Operation Supervisor will file the Work Permit for three (3) months. Although not required, Gas Arabia Services recommends that closed-out work permit be filed at site for the duration of project.

Certification

In order to receive a valid Work Permit Certificate, a person must pass a test and be qualified to do this assigned task given by specific Plant Private Plant, SABIC and ARAMCO).

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Hold Tags and Lockouts

In order to provide controlled security while working on energized equipment "Hold Tags and Lockouts" are utilized.

A "Hold Tag" is attached to the switch point of the de-energized equipment and a lock secures the switch in the "OFF" position. Personnel listed on "Hold Tag" only hold keys; coordination is maintained between Gas Arabia Services Operations personnel and GAS Arabian Services Company Supervisors to ensure that all parties are aware of work in progress.

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SECTION 25: COLOR CODING SYSTEM

The term safety colors are used to describe the standard use of colors for safety purposes in the workplace. There are many standards in place concerning safety colors from a variety of organizations including OSHA, ANSI, and others. Depending on the situation, each color is assigned a different meaning, which allows people to immediately determine what type of safety hazard is in the area, even if they are too far away to read any actual writing.

While there are many organizations and agencies that assign safety colors different meanings, a lot of them have significant overlap. This is done intentionally to help ensure standards apply across as wide a range of situations as possible

GAS ARABIAN COLOR CODING SYSTEM FOR TOOLS & EQUIPMENTS:

BLUE	JANUARY, FEBRUARY, MARCH
GREEN	APRIL, MAY, JUNE
YELLOW	JULY, AUGUST, SEPTEMBER
RED	OCTOBER, NOVEMBER, DECEMBER

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SECTION 26: PERSONAL PROTECTIVE EQUIPMENT

- When a hazardous situation is recognized, steps shall be taken to eliminate the hazard by use of engineering or administrative controls. If engineering and administrative controls do not adequately eliminate the hazard, PPE shall be used to protect personnel from the hazard.
- At a minimum, hard hats, safety glasses and safety shoes shall be worn in restricted areas and project work sites. Additional PPE shall be selected and used based upon the results of a documented PPE needs analysis, which shall consider the exposure hazard(s), materials handled and activities performed by personnel. Contractor's documented PPE needs analysis shall be made available to the upon request.
- Supervisors shall ensure their personnel are trained in inspection, use, maintenance and storage of PPE according to the manufacturer's instructions and this chapter.
- PPE shall meet applicable ANSI requirements or equivalent as specified in writing by the SA Loss Prevention Department.
- Proper PPE (e.g., correct for type of exposure, sized to fit the worker, meets applicable standards, no defects) shall be provided to personnel when/where required.
- PPE shall be visually inspected by the user before each use. Defective or damaged PPE shall not be used and shall be immediately replaced.
- PPE that has exceeded its useable service life shall be immediately replaced.
- Clothing shall be free of holes, excessive wear and other defects. Only proper work clothing (e.g., coveralls, long pants and sleeved shirt) shall be worn by personnel performing Turnaround, maintenance and operations work (e.g., traditional loose flowing "Eastern" style clothing shall not be worn, since it presents tripping and entanglement hazards).
- Personnel shall wear approved hard hats in designated areas, including (1) Turnaround Site (2) operating plant areas, (3) where there are overhead objects or activities that can result in falling or flying objects or (4) when performing activities that have potential electrical shock or burn hazards to the head.
- Hard hats shall meet ANSI Z89.1, Type "1"", Class "E" (electrical) requirements and shall consist of a shell, suspension cradle and, optionally, a chin strap.
- Hard hat suspension cradles shall be properly adjusted. There shall be a minimum 3.8 cm (1.5 inches) clearance between the top of the cradle and the inside of the hard hat shell.
- Hard hats shall bear identification on the inside of the shell stating the name of the manufacturer, ANSI Z89.1 compliance, date of manufacture and class of the hard hat.
- When earmuffs, welder's shields and/or face shields are required they shall be compatible with the hard hat used.
- Hard hats shall not be painted, have holes drilled in them or have large stickers applied to them.
- Hard hats shall be destroyed if they have been damaged (e.g., have a hole, gouge, crack or defective suspension cradle), painted or experienced a sharp impact.
- Metallic hard hats shall not be used.
- Hard hats shall be worn in accordance with the manufacturer's recommendations.
- Hard hats shall be replaced not more than 5 years from the date of manufacture stamped inside the shell. Suspension cradles shall be replaced after no more than 12 months of use.
- Eye and face protection devices shall meet ANSI Z87.1 requirement.
- Approved safety eyewear with side protection shall be worn in designated areas and as needed to protect the worker's eyes from flying particles, chemicals, etc.

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- Prescription safety glasses (spectacles) with side shields and shatter-proof lenses, or over glasses that completely cover the worker's regular prescription glasses, shall be provided to personnel requiring them.
- Additional approved hazard-specific eye/face protection (e.g., safety goggles, face shield) shall be worn as needed to protect the worker's face and neck from flying particles, sprays of hazardous liquids, splashes of molten metal, etc.
- Selection, fit and use of eye and face protection devices shall be based on the hazard and the visual needs/limitations of the intended user. For examples of typical eye and face protection devices.
- Safety glasses or goggles shall always be worn under a face shield and welding helmet.
- Personnel working with or near hazardous liquids shall wear splash-proof goggles with rubber seals that fit flush against the face, including with a face shield if required.
- Electrical workers shall wear an arc rated face shield or arc flash hood.
- Personnel performing welding operations shall wear an approved welder's helmet with the proper lens shade. Torch welders, cutters and bracers shall wear special shaded goggles.
- Gloves shall be selected and worn based on the materials or equipment being handled. Gloves shall be resistant to hazards specific to the job; such as, but not limited to: hot surfaces, acid/caustic/corrosive chemicals, abrasion, sharp edges, high voltage/electrical and cold surfaces/cryogenics.
- Gloves shall be the proper size to fit the wearer's hand to ensure proper grip. One size does not fit all.
- High-voltage rubber gloves with leather protectors shall be worn by electrical workers as required
- Gloves shall not be worn near moving machinery/rotating equipment or when they could present a safety hazard (e.g., where gloves could get caught between moving machinery parts).
- Approved safety footwear shall be worn in field operations, process areas and other designated areas.
- Safety footwear shall be selected and used based on the need for oil/abrasion/chemical/impact resistance, heat protection, electrical insulation and comfort.
- Safety footwear shall fit properly and shall be worn to cover the entire foot, including the heel.
- Safety footwear shall have leather uppers and/or leather composition with steel or non-metallic composite toecaps. Soles and heels shall be of the nonslip type. However, when working in water or wet areas requiring waterproof footwear, rubber safety boots are allowed.
- Personnel working with or near jackhammers, soil compactors and concrete breakers shall wear proper safety shoes, preferably with metatarsal guards.
- Nonconductive safety shoes shall be worn by anyone working on electrical equipment. Safety shoes shall not be used when working on electrical equipment if the shoe becomes wet, the rubber sole is worn through or metal particles become embedded in the shoe's sole or heel.
- Sample supplies of approved hearing protection (e.g., earplugs) shall be provided at the job site and shall be worn in high noise areas (i.e., 85 decibels [Dba] or higher).
- Plain cotton earplugs shall not be used for hearing protection.
- Personnel shall not be exposed to impulse or impact noise levels that exceed the requirements of 85 decibel. The need for additional hearing protection devices shall be evaluated prior to performing work.
- Disposable earplugs shall be discarded at the end of each shift.
- Body protection shall be provided and worn by personnel as needed to protect against hazards such as flash fire, electrical arc flash, abrasive blasting, welding, handling asbestos or acidic/corrosive liquids, etc. This protection may include flame resistant clothing (FRC), Tyvek, leather or non-permeable materials.
- FRC shall be provided to and worn by SA and contractor personnel in the specific locations and operating areas where the SAPO has assessed the flash fire hazard and determined that FRC is required.
- FRC for protection against flash fire.

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EMERGENCY EXIT MOUTHBIT RESPIRATOR

- Emergency escape breathing devices (EEBD) for industrial use that offer the protection to exit hazardous environments. The Speed Evac mouth bit respirator is for escape from toxic non-IDLH levels of ammonia or acid gases (chlorine, chlorine dioxide, sulfur dioxide, hydrogen sulfide or hydrogen chloride).

CHEMICAL GOGGLES

- Goggles must be the chemical splash type with indirect vents and NOT the direct-vented impact goggles. Face shields shall be worn over the top of splash goggles. Employees should have their own pair of safety glasses as a minimum. The glasses should fit and the lenses should not be scratched or clouded.

HAZMAT SUIT/CHEMICAL SUIT

- A hazmat suit (hazardous materials suit) is a piece of personal protective equipment that consists of an impermeable whole-body garment worn as protection against hazardous materials. Such suits are often combined with self-contained breathing apparatus (SCBA) to ensure a supply of breathable air.

CHEMICAL GLOVES

- Chemical-resistant gloves are formulated to resist chemical degradation thereby protecting your workers hands. These work gloves can be made from nitrile, latex, neoprene, vinyl, PVC or rubber.

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SECTION 27: SAFETY SIGNAGES

1. Danger:
   This indicates an immediately hazardous situation, which, if not avoided, will result in death or serious injury. "Danger" is usually indicated by white text with a red background, used when there is a high probability of death or severe injury. Do not use this for property damage unless personal injury risk is present.

2. Warning:
   This indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury. The sign is usually in black text with an orange background, used in situations that have some probability of death or sever injury. not use this for property damage unless personal injury risk is present.

Do

3. Caution:
   This indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. This is usually in black text with a yellow background, used in hazardous situations that may result in minor or moderate injury. Do not use this for situations when there is a possibility of death or severe injury.

4. Safety First:
   This indicates a general instruction relative to safe work practices, reminders of proper safety procedures and the location of safety equipment. Do not use this for hazardous situations where death or sever injury may occur.

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5. Notice:
   This indicates a statement of a company policy as the message relates directly or indirectly to the safety of personnel or protection of property. Do not use this for situations where death or sever injury may occur.

Point to Notes

- The sign will sometimes include an explanatory text that is intended to provide additional safety information.
- Some signs are designed to convey a personal safety message. These signs suggest the use of safety glasses or hearing protection when in the area.
- In symbol signs, a pictorial message appears alone or is combined with an explanatory text. This allows the safety message to be conveyed to people who are illiterate or who do not understand the local language.
- Large, fixed machinery such as lathes and milling machines present a hazard to the operator and others working in the area. To prevent accidents, a machinery guard or a yellow painted line on the floor usually borders this equipment.
- Machinery guards and yellow lines will prevent people from accidentally walking into the operating equipment or indicate that a safe distance should be kept from the equipment.
- Soundproof rooms are usually used when a lot of noise is made by operating equipment. An example is the use of a chassis dynamometer. A vehicle operating on a dynamometer produces a lot of noise from its tires exhaust and engine. To protect other workshop users from the noise, the dynamometer is usually placed in a soundproof room, keeping workshop noise to a minimum.
- Exhaust gases in workshops are a serious health hazard. Whenever a vehicle's engine is running, toxic gases are produced from its exhaust. To prevent an excess of gas build-up, a well-ventilated work area is needed as well as some method of extracting the toxic gases.
- The best way to get rid of these gases is with a suction hose that fits over the vehicle's exhaust pipe. The hose is attached to an extraction pump that vents the gas to the outside.
- Doors and gates are used for the same reason as machinery guards and painted lines. A doorway is a physical barrier that can be locked and sealed to separate a hazardous environment from the rest of the workshop, or a general work area from an office or specialist work area.
- In the day-to-day operation of a workshop, there is often a reason to temporarily separate one work bay from others. If a welding machine or an oxyacetylene cutting torch is in use, it may be necessary to place a temporary screen or barrier around the work area to protect other workshop users from "welding flash" or injury.

Part 2: Step-by-step instruction

1. Workshop Layout
   Familiarize yourself with your workshop. There are special work areas that are defined by painted lines. These show the hazardous zone around certain machines and areas. If you are not working specifically on the machines, you should stay outside the marked area.

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2. Observe Warning Signs
   Study the various warning signs around your workshop. Understand the meaning of the Signal Word, the colors, the text and the symbols or pictures on each sign. Ask your supervisor if you do not fully understand any part of the sign.

3. Identify Exits
   Find out where every door, window and gate is, and whether they are usually open or locked. Plan your escape route, should you need to exit in a hurry.

4. Check Air Quality
   Check for air quality. There should be good ventilation and very little chemical fumes or smell. Locate the extractor fans or ventilation outlets and make sure they aren't obstructed in any way. Locate and observe the use of the exhaust extraction hose, pump and outlet that's used on the vehicle's exhaust pipes.

5. Identify firefighting equipment
   Check the location and types of fire extinguishers in your workshop. Be sure you know when to use each type, and how.

6. Identify flammable hazards
   Find out where flammable materials are kept, and make sure they're stored properly.

7. Identify hazards – Compressed Air
   Check the hoses and fittings on the air compressor for any damage or excessive wear. You have to be particularly careful when troubleshooting air guns. Never pull the trigger while inspecting it – severe eye damage can result.

8. Identify hazards – Corrosives
   Find out which liquids will burn or corrode parts, metals or skin. Identify caustic chemicals and acids associated with activities in your workshop.

9. Personal Protection
   Be aware that YOU could be a hazard in the workshop, if you don't wear mandatory protective gear when working on hazardous machines.

10. Equipment hazards
    Ask your supervisor for information on any special hazards in your particular workshop and any special avoidance procedures, which may apply to you and your working environment.

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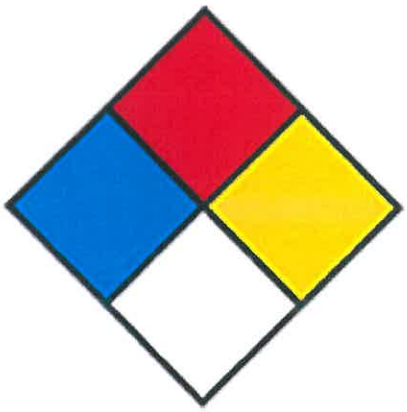
SECTION 28: NFPA HAZARD IDENTIFICATION

NFPA Hazard Identification System



BLUE Diamond Health Hazard

- **4** Deadly
- **3** Extreme Danger
- **2** Hazardous
- **1** Slightly Hazardous
- **0** Normal Material

RED Diamond Fire Hazard (Flash Point)

- **4** Below 73 °F
- **3** Below 100 °F
- **2** Above 100 °F
  Not Exceeding 200 °F
- **1** Above 200 °F
- **0** Will Not Burn

YELLOW Diamond Reactivity

- **4** May Detonate
- **3** Shock and Heat; May Detonate
- **2** Violent Chemical Change
  - **1** Unstable if Heated
  - **0** Stable

WHITE Diamond Special Hazard

- **ACID** – Acid
- **ALK** – Alkali
- **COR** – Corrosive
- **OXY** – Oxidizer
- ☢ – Radioactive
- **W** – Use No Water

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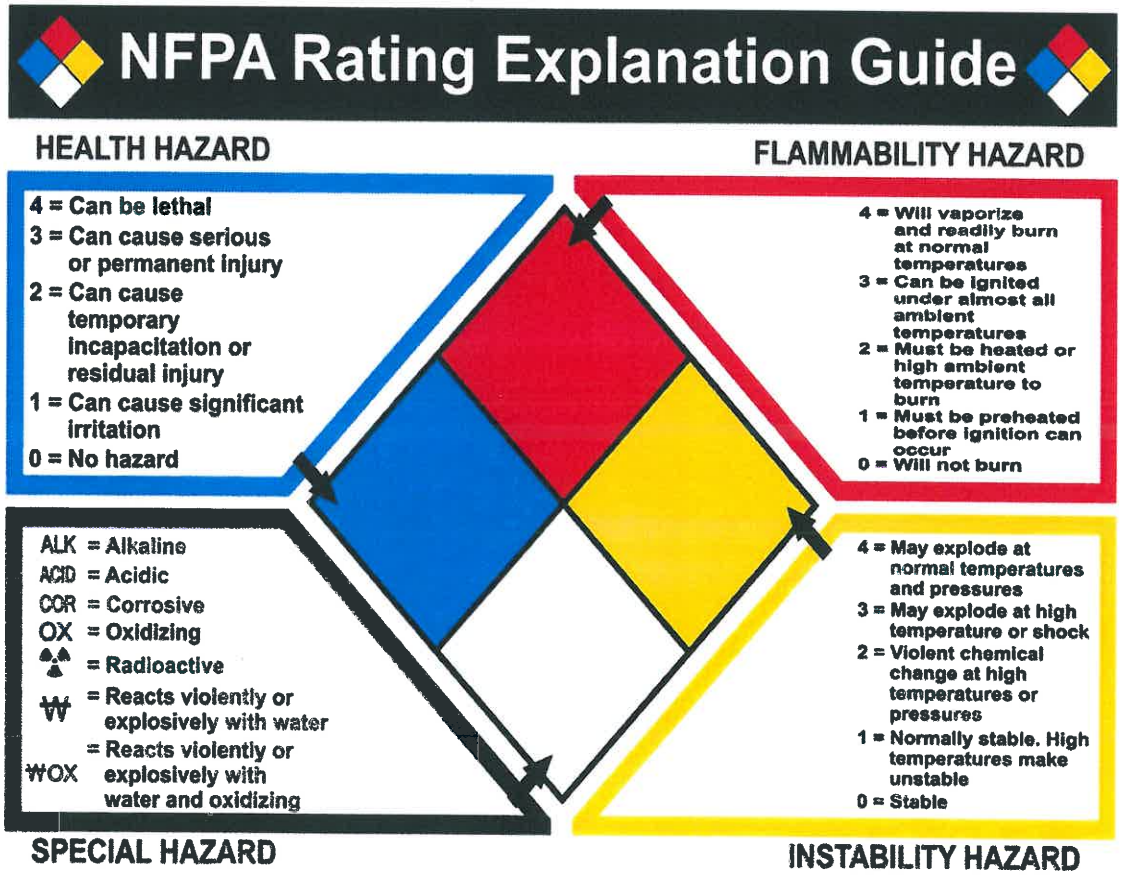

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SECTION 29: CHEMICAL SAFETY, STORAGE COMPATIBILITY & MSDS

Chemical Information

There are thousands of chemicals in existence and hundreds of new ones are being developed for commercial use every year. While almost all of these chemicals are beneficial in some way, they can be dangerous too. In fact, of the thousands of chemicals in existence, it is difficult to find any that are absolutely harmless. It is very important for every employee involved in these substances to read and understands the instruction from the Material Safety Data Sheet (MSDS) for every chemical before dealing with it. Using the MSDS will inform the employee: a). The safety and health hazards involved during handling, transportation and storing hazardous materials b). Required personal protective equipment c). Firefighting methods and any additional information essential to safety and health. Each material or chemical delivered to site is mandatory to have MSDS.

When dealing with unfamiliar chemical, it is always wise to assume that it is hazardous. The exposure to hazards associated with a material depends largely on its proper identification, handling, use, transport, storage and disposal. In addition, materials, which may be completely harmless in one application, may be deadly in another. Handling, use and storage of these materials shall be in accordance to client Private Sector, SABIC and Saudi Aramco requirements.

There are too many chemicals and too many possible combinations to deal with them individually here. In the references listed, there are many sources of information on the identification, storage transportation, use and disposal of hundreds of chemicals. In the literature there are tables of hazardous chemical reactions. If the name of the chemical is known, the names of others with which it is likely to reach dangerously can be found. The proper identification and labeling of chemicals is a very important safety precaution.

When dealing with a potentially harmful chemical, precautions should be taken to ensure that employees do not swallow it, inhale it, or allow it to contact their skin. The chemical must not be allowed to accidentally mix with other substances in transportation, storage or use. It must not be subjected to undue shock, pressure, or heat. When the chemical is no longer needed, it must be safely disposed of or recycled.

Health Hazards

Hazards to health arise from inhaling, swallowing, or skin contact. The severity of the hazard ranges from nuisance chemicals that produce no injury, to chemicals that on short exposure can cause severe injury or death. For industrial workers, the most prominent means of entry of a hazardous chemical into the human body is through the respiratory tract by inhalation. The next most important means of entry is through skin absorption. The least hazardous pathway is through swallowing the chemical, as this seldom occurs in industry.

Every person exposed to corrosive or other harmful substances shall be provided with liquid proof protective suits, hoods, aprons, legging, gloves, respirator and other protective wear required depends on the nature or the hazardous characteristics of the chemical, the way it is used and the risk involved. Dealing with this material shall be in accordance to Private Plant, SABIC and Saudi Aramco Safety Manual and requirements.

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Emergency Treatment

1. *Artificial Respiration*

Persons overcome by harmful gases and vapors must be taken out into the fresh air and if they have stopped breathing, given artificial respiration, if there is no heartbeat, commence cardiopulmonary resuscitation (CPR).

Fire Hazards

- Only the necessary number of hazardous materials should be brought into the workplace, usually not more than one-day supply. Hazardous materials must not be allowed to accumulate, and any extra amounts should be cleared away immediately. All flammable materials should be stored according to the specifications of their Chemical Hazard Bulletins, (CHBs) or Material Safety Data Sheets (MSDS).
- Smoking and the use of ignition devices near flammable liquids or finely divided combustible solids must be prohibited.
- The use of fire-fighting equipment, such as fire extinguishers or water streams, must be available in case all effective fire prevention measures fail to prevent a fire. Ordinary sand is a good extinguishing agent for smothering small fires. The proper fire extinguisher should be at the job site and readily available at all locations where a fire hazard exists.

Transportation, and Disposal

During transportation, hazardous materials must be protected against shock, accidental mixing with other materials, damage to containers, undue heat from the sun or other sources, and theft, which could allow the hazardous materials to come into contact with people who are unaware of the dangers. The vehicle transporting any chemicals shall be suitably labeled. Hazardous materials shall be stored in containers that are safe for transportation and use of material. Contents must be labeled with the appropriate hazardous material to indicate the actual contents.

Storage

Specific storage recommendations for hazardous materials contained in the manufacture's provided Material Safety Data Sheet (MSDS) must be followed. Incompatible chemicals should not be stored together.

1. Trained employees in accordance with the manufacturer's recommendations shall carry out handling, use, and storage of hazardous materials on the project.
2. The temperature of storage rooms shall be maintained to prevent moisture from rendering the materials unsafe or unsuitable for use.
3. Those materials that can give reactions in room temperature shall be isolated or separated in different locations.
4. Warning signs indicating the hazards of the stored product, emergency instructions, including telephone numbers and firefighting information, shall be conspicuously posted at storage areas.
5. Employees authorized to enter the store shall be trained in safe practice and those persons employed in the stores shall not have a defective sense of smell or impaired vision.
6. Persons handling or using hazardous materials shall wear appropriate personal protective equipment. Flammable chemicals shall be stored in separate locked buildings well away from any source of ignition.

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Storerooms shall be of fire-resistant well ventilated with no naked lights or other source of ignition, and be kept securely locked. Ammonium nitrate and diesel oil should never be stored together. Chemical used for chlorination of swimming pools is highly dangerous and should be stored in a cool, dry, well-ventilated place removed from other chemicals.

Toxic chemicals shall be stored in ventilated areas. If chemicals are likely to decompose as a result of heat, moisture, acids, etc., then they must be protected. Chemicals that can react with each other must be kept apart. The manufacturer's data sheet shall list any known reactants.

Corrosive chemicals can cause harm if spillage occurs. They shall be stored in a well-ventilated cool place. Storage in direct sunlight shall be avoided. Corrosive resistant spillage trays shall be provided.

Disposal

Disposal of these materials shall be in accordance to Client Safety Manual and requirements.

Environmental

- Spillage or leaks of hazardous substances shall be dealt with in accordance with the manufacturer's instructions.
- Disposal of surplus and excess materials shall be carried out safely to prevent contamination or pollution to water supplies, including ground water wells, wadis, and streams.
- Spillage of hazardous chemicals shall not be flushed into drains.
- Containers or drums that have been used for hazardous chemicals shall not be used for any other material or purpose. Disposal shall be arranged in accordance with the manufacturer or supplier's recommendations.
- Distribution of hazardous chemicals shall be planned and controlled to prevent contamination of persons, animals, or food.
- Disposal of contaminated ground due to spillage of leaking of hazardous chemical shall be carried out after consultation with the Client regarding local requirements.
- The disposal of surplus timber on site by burning requires extra precautions, if the timber has been treated with preservative materials.

Material Safety Data Sheet

CRC Cleaning Agent.pdf	WD 40 MSDS.pdf	Nitrogen Gas Cylinder.pdf	Oxygen Gas Cylinder.pdf
AC 90 Multipurpose Lubricant Concentra	MOLYKOTE 1000 PASTE EN 2017-03-1.	Loctite Seal Maker 518.pdf	SKF Bearing Grease LGMT 3.pdf

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SECTION 30: WORKING AT HEIGHTS

The primary means of achieving safe working conditions when working at heights is to provide adequate and sufficient access and egress arrangements and suitable working platforms at the place of work.

- A Toolbox Talk will be given to each person carrying out work at height. Following an assessment of the risks, supervisors will instruct personnel on the procedures and precautions to be followed when working at height.
- Approved full body safety harnesses should only be used as a last resort where conditions make it impracticable to provide a safe working platform.
- Supervision shall use the pre-works checklist form with all new personnel or personnel not familiar with working at height, during the Shutdown period.

Gin Wheel

- Raising and lowering materials using a gin wheel shall be mounted on a cantilever horizontal tube projecting outward from the scaffold and shall be kept to a minimum distance, not greater than 30 inches.
- Material to be raised shall not exceed 50 kg, the rope shall be of the correct size to the gin wheel usually 18mm or ¾ inches diameter.
- Use a tool bag where materials, parts and tools are to be secure inside this bag and pulled by the gin wheel attach using a rope.

Self-Reeling Arrestor Device

Self-Reeling Arrestor Devices (Inertia Reels) Inertia reel devices are directly attached to the safety harnesses and anchor points provide good protection against falls and allow flexibility of movement.

- These devices shall be securely anchored using shackles or karabiners attached to wire-rope slings or webbing slings. Regular inspections and checks of these devices shall be carried out in order to ensure that they operate efficiently.
- These devices provide fall protection to personnel engaged in the installation of other fall protection systems, e.g., Life lines, scaffolding etc.

Other Arrester Devices

- There are other arrester devices available for use which are not self-reeling and, where anchorage points are limited. Such systems may allow free vertical movement as well as movement around corners and past obstacles without the need to unhook safety harnesses. Note: Devices such as cable arrestor and 'rail lock' ladder fall arrest systems etc. shall only be installed and maintained by competent persons.
- Man lock Girder Grip Devices These devices are inserted into pre-drilled holes in structural steelwork and are used by steel erectors during the erection of structures. Note: Whenever possible the erection of structures shall include the programming and provision of permanent staircases at the earliest possible stage.

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Scaffolds

Scaffolds are provided for the purpose of access to, and support for, a working platform from which work can be carried out in a safe and convenient manner and shall be built in accordance with Project Procedure for Scaffolding.

- Each person who calls fall more than 1.8m or 6 feet shall be protected from falling by means of guard rail system, personal fall arrest system, personal fall restraint system.
- Guard rail shall be able to withstand a force of at least 90kg or 200 lbs.
- Top rail minimum height is 38 inches and maximum height of 45 inches. Mid rail installed approximately halfway between the working surface and top rail.
- Toe board should have a maximum gap of ¼ inch above the working surface, with a minimum thickness of 25mm or .98 inch, should withstand a force of at least 23 kg or 50 lbs.
- A safe means of access shall be provided whenever the scaffold platform is 0.6m or 2 feet above or below a point of access.

Ladders

Ladders should be used primarily as a means of access, NOT as a working platform.

- If work is required to be carried out from ladders, personnel shall use and wear approved safety harnesses as a means of fall protection.
- Ladder should be suited for the purpose for which it is to be used and free from defects.
- Ladders shall be set on a firm level base. Makeshift props should not be used to gain extra height or to level up stiles.
- Ladders should not cause a hazard by placing them where they may be struck or dislodged. Barriers should be placed around the foot of the ladder where necessary
- Ladders should, wherever possible, be secured at the top and bottom by lashing. In cases where the ladder is unable to be secured, someone should be instructed to steady the ladder by standing at the bottom and holding the ladder in place with one foot on the bottom rung (permitted only if the ladder is shorter than 5 meters).
- Ladders should not rest against any fragile surface or fitting.
- Ladders must extend at least 1.05 meters above the landing place unless some other suitable handhold is available.
- Both hands must be free when ascending or descending ladders. Tools and materials should be carried in either a suitable shoulder bag or belt, or be hoisted up afterwards.
- Ladders should be pitched with a one in four incline 75 degrees to the horizontal.
- Personnel using ladders must be trained and instructed in the hazards associated with their use and the measures to be adopted to prevent ladder accidents.
- A slope of 4:1 side rails or a 75 degree angle rigidly attached to supporting structures
- Shall have a minimum clear distance of 30 inches to the nearest protruding objects on the climbing side. The distance maybe reduced to 24ninches if the deflector plates or rebar steel cover are provided on the top most end.
- If an internal ladder is used, the opening shall be at least 27 inches or 3 planks wide and not less than 36 inches or 3 feet above the landing.
- If an external ladder is used, step through opening width on guardrails shall not be less than 27 inches and not more than 30 inches.

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Temporary Work Elevated Work Platforms/Walkways

Temporary work platforms/walkways e.g., those constructed from lightweight staging's, must be adequately supported and secured in order to prevent undue movement.

- Edge protection must be provided on temporary work platforms/walkways.
- Safety harnesses are required to be worn whenever personnel gain access onto temporary work platforms/walkways.
- Personnel working from Mobile Elevating Work Platforms (MEWPs), and Man Riding Skips and Cradles shall attach their safety harnesses to a secure anchorage point.
- Safety harnesses must be used by personnel who are (I) not fully protected by complete platforms or walkways or (ii) are required to carry out work below guard-rail level.

Mobile Work Platforms (Scissor Lift, Cherry Pickers)

- Drivers of mobile work platforms e.g., cherry pickers, scissors lift etc. shall be specifically authorized to operate the platforms and be trained and competent on the type of lift to be operated.
- Personnel riding in or working from mobile work platforms must wear an approved safety harness securely connected to a suitable anchor point on the platform.
- The mobile work platforms should be operated on level and firm ground conditions in order to alleviate the possibility of overturning.
- There must be adequate clearance in order to prevent the mobile work platform colliding with adjacent structures, overhead power lines, other vehicles etc. Cones and warning lights should be erected around the machine where necessary.
- Mobile work platforms should be subjected to regular inspections and maintenance by a competent person.
- Safe working loads and the permitted number of persons on the platform must not be exceeded.

Mobile Elevated Working Platforms (MEWPs) – (Man Lift)

- MEWPs should only be erected by skilled and competent persons and MEWPs should be clearly marked with the safe working load and permitted number of persons allowed on the platform at each configuration.
- Operators should not carry out repairs and adjustments to MEWPs unless qualified and authorized to do so.
- Safe means of access to the platform should be provided at its lowest level. This may be by a short-fixed ladder, a raised platform, or by control arrangements which allow the platform to be brought down to ground level.
- Ground conditions must be checked for adequate bearing.
- A safety barrier must be erected to exclude personnel from the area below the platform should only be used by trained operatives.
- MEWPs should be inspected daily before use by the user.
- MEWPs should be regularly inspected by a competent person and records of inspection should be kept.

Man Basket

- The skip or cradle used for man-lifting must conform with the following: - o The SWL should be clearly marked on the skip/cradle together with the maximum number of persons it can carry.
- The guard-rail height must be 1.05m (3.4 feet) to 1.15m (3.7 feet) o the toe board height must be a minimum of 150mm and a mid-rail must also be fitted. o The crane carrying out man lifting must be fitted with a `dead mass handle' and powered lowering facilities. Men must never be lowered in free fall conditions. o Personnel

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working out of man riders must wear an approved safety harness and attach their lanyard to a collar chain or sling which is attached to the crane hook.

- The crane capacity load chart shall be de-rated 50% when lifting an occupied Man Basket.
- Man, Basket crane lift shall not be performed in wind speed exceeding 25 km per hour or 15 Miles per hour.

Skeletal Steel/Open Structures

This section deals with fall protection when personnel are required to gain access to move across and work on skeletal steel/open structure such as pipe racks. Included is movement across or work being carried out on any elevated surface which is not designed as a walkway or working platform e.g., pipe, cable tray etc.

- Personnel working or moving across elevated skeletal steel/open structures more than 2 meters above ground level shall wear an approved safety harness and secure their lanyards to suitable fall arrest equipment or the structure itself. Note: This includes both vertical and horizontal access.
- Vertical access on these structures shall be gained by means of properly positioned and secured access ladders.
- Personnel must avoid securing lanyards to cable trays, conduit and small-bore screw pipes.
- The work area shall be surveyed to ensure that no damage can be incurred to installed equipment prior to work commencing.

Permanent Structures, Stairs, Ladder Cages & Fix Ladders

- Personnel working or moving across permanent decks, floors and walkways which do not present fall hazards are not required to wear safety harnesses provided that they can access these structures by fully completed stairs or personnel hoists.
- Personnel working or moving across incomplete structures where there is a risk of falling more than 2 meters must wear and use approved safety harnesses attached to fall arrest equipment on the structure.
- Temporary or permanent guard rails and floor covers shall be installed as soon as possible in order to eliminate the risk of falling.
- Only authorized and competent personnel shall work from incomplete structures on the installation of fall arrest measures. Permanent stairs shall be used to access or egress elevated work platforms. The installation and completion of permanent stairs shall be a priority.
- Personnel climbing ladders must keep both hands free. The carrying of items by hand whilst climbing ladders is prohibited.
- Personnel erecting structural steelwork must be provided with and use suitable fall protection, including safety harnesses, Life lines, self-reeling arrestor devices etc.
- Climbing of columns and walking of structural steelwork is prohibited.
- Straddling steelwork is permitted provided that adequate fall protection is utilized during this operation. Note: It is particularly important to ensure that all personnel know and understand the methods of work necessary for ensuring that they stay secured at all possible times when working at height, numerous fatalities have occurred through personnel unclipping themselves to access their work and the inherent hazards must be stressed during task briefings and training sessions.

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Reinforced Rebar Steel for Column

- Personnel working more than 2 meters above ground level on rear walls, piers and on concrete form walls must be provided with adequate fall protection like scaffolding platform when it is reasonably practical or when it is stated on method of statement; or use safety belts with a short lanyard without shock absorber arrestor, or full body harness with lanyard and shock absorber or Rebar Positioning Chain Assembly Arrestor or simply a wooden plank when the scenario requires.
- Specific Job Safety analysis should be carried out on this work. Personnel must receive specific instruction on the equipment to be used and the fall protection procedure to be utilized during the work.

Crane Rigging/De- Rigging

- Personnel engaged in crane rigging/de-rigging must wear and use suitable and sufficient fall arrest equipment e.g., safety harnesses, retractable lifelines etc.
- Movement in elevated areas must be minimized by the use of ladders and if required mobile elevated working platforms.
- Walking across the chords and struts of crane booms without continuous fall protection such as Life lines is prohibited.
- Specific tool box talks on fall protection must be given to all personnel involved with crane rigging/de-rigging prior to work commencing.

Rigging/Material Handling Offloading Trailers

- Ensure that the load is stable before commencing to unload the trailer.
- Inspect trailer beds for holes or weak decking.
- Do not stand between any load being hoisted and the lifting appliance being used.
- Use tag lines to control loads. Always stand clear of loads being lifted.
- Before unloading pipe, spools ensure that the pipes are stable before removing the retaining straps.

Rigging Large Loads

- The rigging of and lifting of loads which require work at height require personnel to utilize fall protection. The work shall be planned and ladders for access and egress provided.
- Fall protection can be provided by means of self-reeling arrester devices during the rigging of large loads.
- The use of Mobile Elevated Work Platforms (MEWPs) can reduce the risk of falls during rigging operations.

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Work Over Water

Personnel working over water shall have a floatation ring provided at intervals not greater than 15 meters or 50 feet and a man watch shall also be provided.

High Winds

Personnel shall not be in any scaffold, roofing or other temporary elevated work area during storms or high winds – sustained winds more than 65 km per hour.

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SECTION 31: HSE TRAINING PROGRAMS

SN	HSE TRAING PROGRAMS	NATURE	TARGET AUDIENCE	CLICK THE ICON
1	Safety in the Use of WD-40 Degreaser, Lubricant and Rust Removal.	• Chemical Safety • Fire Safety • Mechanical Safety	• Mechanical Technician • Mill Wright Technician	Safety in the Use of WD 40.pptx
2	Safety in the Use of CRC Contact Cleaner for electrical, electronics and instrument.	• Chemical Safety • Electrical Safety • Instrument Safety	• Electrician • Instrument Technician	Safety in the Use of CRC Contact Cleane
3	Safety in the Use of Molykote 1000 Paste	• Chemical Safety • Mechanical Safety • Piping Safety	• Pipe Fitter • Mechanical Technician • Millwright Technician	Safety in the Use of Molykote Paste.ppt›
4	CHOOSING THE CORRECT WEB SLING CAPACITY – Minimum Rated Capacity Web Sling Vs. Safety Advise	• Slinging Safety • Lifting Safety • Technical Safety	• Rigger • Mechanical Technician • Rotating Engineer • Rotating Supervisor	CHOOSING THE CORRECT WEB SLIN(
5	SAFETY FACTOR, WORK LOAD LIMIT, SAFE WORK LOAD of Shackles	• Slinging Safety • Lifting Safety • Technical safety	• Rigger • Mechanical Technician • Rotating Engineer • Rotating Supervisor	SAFETY FACTOR, WORK LOAD LIMIT &
6	CALCULATE THE WEIGHT OF A SOLID STAINLESS STEEL SHAFT.	• Slinging Safety • Lifting Safety • Technical safety	• Rigger • Mechanical Technician • Rotating Engineer • Rotating Supervisor	Calculate the Weight of the Stainl
7	SAFETY FACTOR, WORK LOAD LIMIT, SAFE WORK LOAD of Chain Sling found on Chain Block	• Slinging Safety • Lifting Safety • Technical Safety	• Rigger • Mechanical Technician • Rotating Engineer • Rotating Supervisor	SAFETY FACTOR, WORK LOAD LIMIT &

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SECTION 32: SCAFFOLDING

GAS Arabian Services will strictly follow the safety procedures concerning the use of scaffolds in the job site. GAS will ensure that proper use of scaffolding will be carried out and Client Scaffold Safety Handbook will be implemented.

Scaffolds Safety

- Employees shall not erect, alter, or dismantle scaffolds unless directed by a competent person.
- Scaffolds shall be erected and plumb on a sound foundation. Loose bricks, lumber, etc., shall not be used to level or support scaffolds.
- Scaffold materials shall be free of defects.
- Supporting structures must be completed with each elevation diagonally braced in each direction.
- Work Platforms shall:
  - Be completely decked. The decking should overhang its end supports at least 6" but not more than 12". The decking shall be secured in place.
  - Be equipped with standard guardrail, mid-rail and toe boards when 6 or more feet in height.
- Employees working from scaffolds must wear approved fall protection equipment. If work platform is incomplete, secure their safety lanyard to some other adequate structure or lifeline.
- Rolling scaffolds must not be over 4 sections high unless secured while in use.
- Employees shall not ride on rolling scaffolds.

DO's:

- Inspect the scaffold using a checklist or mobile inspection app before the work shift and ensure it is safe and in proper working order.
- Provide proper training.
- Have a toolbox talk before beginning work
- Wear appropriate PPE.
- Always check inspection tags.
- Know the weight capacity of the scaffold.
- Have a handhold above the scaffold platform.
- Level the scaffold after each move. Do not extend adjusting leg screws more than 12 inches.
- Use your safety belts and lanyards when working on scaffolding at a height of 10 feet or more above ground level. Attach the lanyard to a secure member of the scaffold.
- Safely use the ladder when climbing the cross braces for access to the scaffold.
- Keep both feet on the decking.
- Stay off scaffold during loading or unloading.
- Ensure planking is overlapping or secured from movement.
- Follow the manufacturer's instructions when erecting the scaffold, under the direct supervision of a competent person.
- Be mindful of co-workers working above and below you at all times, as well as others working on the scaffold.
- Use the debris chutes or lower things by hoist or by hand.

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- Chock the wheels of the rolling scaffold, using the wheel blocks, and also lock the wheels by using your foot to depress the wheel-lock, before using the scaffold.
- Always use netting to catch anything that falls.

DON'Ts:

- Leave anything on the scaffold at the end of your shift.
- Overload the scaffold.
- Use unstable objects such as barrels, boxes, loose brick or concrete blocks to support scaffolds, increase your work height or planks.
- Work on platforms or scaffolds unless they are fully planked.
- Use a scaffold unless guardrails and all flooring are in place.
- Stand on ties, guardrails, or extensions.
- Use the scaffold if it appears damaged in any way, has been tampered with, or if there are components missing such as planking, guardrails, toe boards, debris nets or protective canopies.
- Walk on scaffold planking covered in ice, snow or mud.
- Avoid using a scaffold during adverse weather such as heavy rain, sleet, ice snow or strong winds.
- Climb on any portion of the scaffold frame not intended for climbing.
- Never climb with any materials or tools in your hand, they should be hoisted up to the scaffold separately.
- Jump from, to, or between scaffolding.
- Lean out or overreach outside the guardrails.
- Rock the scaffold.
- Throw anything "overboard" unless a spotter is available. ➢ Move a mobile scaffold if anyone is on it.

Requirements Common to All Scaffolding

1. Foundations
   - A sound base is essential; therefore, the ground or floor on which a scaffold is going to stand must be carefully examined. Sand or made-up ground may need compacting to ensure there are no cavities. Such bases as floors, roofs, etc., may need shoring from underneath.
   - Scaffolds, including components, shall be capable of supporting without failure at least 4 times the maximum intended load.
   - Timber sills at least 23 centimeters (9 inches) wide by 3.8 centimeters (1 ½ inches) thick (not scaffold planks) will be required to spread the load on sand, made up ground, asphalt pavement, wooden floors, and slippery surfaces. A sill shall extend under at least two posts.
   - Where scaffolding is erected on a solid bearing such as rock or concrete, small timber pads may be used in place of sills and nailed to prevent the base plates sliding off.
   - Concrete blocks, barrels, and other loose or unsuitable material shall not be used for the construction or support of scaffolding.
   - If used to compensate for variations in ground level, the screw jack shall not be adjusted to more than two-thirds of the total length of the thread. The base plate shall be of a type approved for supporting scaffolding posts. (See manufacturer's specifications.).

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2. Posts
   - Posts shall be pitched on 15 centimeters (6 inches) by 15 centimeters (6 inches) steel base plates and at least 0.64 centimeter (1/4 inch) thick. Joints in posts should be staggered, i.e., joints in adjacent posts should not occur in the same lift. All posts shall be vertical.
   - The inner row of posts shall be placed as close as possible to the face of the building or structure. To avoid projections, the posts may be up to 41 centimeters (16 inches) away from the wall or structure as necessary, provided that, where there is room to do so, the gap between the wall or structure and the inner posts shall be closed with planks on extended board bearers. The outer row of posts shall be positioned from the inner row of posts depending on the load requirements of the scaffold, and the working platform shall be fully decked out.

3. Runners
   - Runners shall be securely fixed to posts with standard couplers and shall be horizontal. Joints in runners should be staggered, i.e., joints in adjacent runners should not occur in the same bay. Runners should be secured end-to-end by sleeve couplers, not by joint pins.
   - Runners shall be vertically spaced not more than 2.0 meters (6 feet, 6 inches) to give adequate headroom along the platforms.

4. Bearers
   Bearers should be installed between posts and securely fixed to the posts bearing on the runner coupler and secured with standard couplers. When coupled directly to the runners, the coupler must be kept as close to the posts as possible. These bearers must remain in position, as they are a structural part of the scaffold.

5. Board Bearers
   Board bearers shall be installed between bearers to accommodate differences in plank lengths. Board bearers shall be secured to the runners between bearers where necessary to support platform units (planks). These may be removed when no longer required to support platform units.

6. Bracing
   - Cross bracing shall be installed across the width of the scaffold at least every third set of posts horizontally and every fourth runner vertically. Such bracing shall extend diagonally from the inner and outer runners upward to the next outer and inner runners. These braces should be fixed to the runners with standard couplers as close to the posts as possible. Where such a fixing is impracticable, adjustable couplers may be used to fix the braces to the posts.
   - Longitudinal diagonal bracing shall be installed at approximately 45 angle from near the base of the first outer post upward to the extreme top of the scaffold.
   - Where possible, such bracing shall be duplicated at every fifth post. On short but high runs, diagonal bracing shall be installed at an angle of 45 from the base of the first outer post to the last outer post and shall alternate directions to the top of the scaffold. When bracing cannot be attached to the posts, this bracing may be attached to the runners, as close as possible to the posts. Only standard couplers or adjustable couplers may be used. Joints in braces shall be made with end-to-end or parallel couplers.

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- Temporary rockers (inclined load-bearing tube supports) brace the scaffold against the ground when setting out. These rockers are replace by permanent braces when the scaffold has been plumbed, leveled and tied. Rockers must be secured with proper couplers at the scaffold and coupled to a ground stake.

7. Ties
   - It is essential that all scaffolds, with the exception of certain tower and mobile scaffolds This should be done by connecting a tie tube to both runners or posts and coupling this to a two-way tie or column box tie assembly.
   - Where the foregoing is impracticable, tubes may be securely wedged between opposing surfaces on the building or structure by the use of reveal pins and coupled to the tie tubes. Where reveal ties are used, they shall not exceed 50% of the total number of ties. Two-way ties or column box ties shall be evenly distributed over the scaffold area. To ensure the security of reveal ties, it is necessary to check frequently for tightness.
   - Ties shall occur at the top of the scaffold and at least every 7.9 meters (26 feet) vertically and 9.1 meters (30 feet) horizontally and at each end of the scaffold. All tie assembly connections shall be made with standard couplers.

8. Platform Units
   - All platform units (i.e., planks, fabricated decks, etc.) shall be closed planked with, whenever practicable, each plank resting on at least three supports. Planks shall extend over their end supports by not less than 15 centimeters (6 inches) and not more than 30.5 centimeters (12 inches).
   - Supports for scaffold planks shall be spaced with due regard to the nature of the platform and the load it will bear.
   - Except on platform units adjacent to the surface of a cylindrical or spherical structure, planks shall be laid flush.
   - Planks shall be secured in position to prevent displacement by high winds.
   - Adequate space for men to pass in safety shall be provided and maintained wherever materials are placed on platform units or if any higher platform is erected thereon.
   - Platform units shall be kept free of unnecessary obstructions, materials, and projecting nails.
   - Platform units which have become slippery with oil or any other substance shall be cleaned, or otherwise removed and replaced.
   - Slopes in platform units shall not exceed 1 vertical to 4 horizontal and stepping cleats at 0.3 meter (1 foot) intervals shall be provided.
   - All platform units shall be closed planked for the full width of the scaffold structure.

9. Guardrail Systems and Toe-boards
   - Guardrail systems (consisting of top-rails and mid-rails) and toe-boards shall be installed at all open sides and ends of all scaffolds and supports on not more than 3-meter (10-foot) centers from which men or materials could fall a distance of more than 1.8 meters (6 feet). Top-rails shall be not less than 0.91 meter (36 inches) and not more than 1.14 meters (45 inches) above the working surface; mid-rails shall be installed equidistant between the working surface and the top-rail. Toe-boards shall not be less than 10 centimeters

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(4 inches) in height by 2.5 centimeters (1 inch) thick. Guardrail systems and toe-boards shall be securely fixed to the inside of posts to withstand a lateral thrust of 200 pounds.

- Landings: Safe landings shall be provided at the top of all ladders. Rings shall be eliminated above the landing level, and side rails shall extend 36 to 42 inches above the landing for mounting and dismounting. Where multiple ladders are required, solidly decked platforms shall be provided. Guardrails, intermediate rails and toe boards shall be erected on the outside edges and exposed sides of the platform.

10. Access

Access to a working platform is best achieved by providing a separate ladder tower or a cantilevered access platform so as not to obstruct the working platform and to minimize the risk of persons falling through gaps in the guardrail system or platform units. Access must be provided to working platforms.

11. Scaffold Ladders

Scaffold ladders provide the means of access and egress for scaffolds. They can generally be classified as follows:

- Straight ladder is a portable ladder that only consists of one section, which determines its overall length. It cannot support itself or be adjusted in length.
- An extension ladder is a portable ladder that cannot support itself but can be adjusted in length. It consists of two or more sections, which are arranged to permit length adjustment. Its overall length is the sum of the length of all its sections measured along the side rails.
- Portable straight and extension ladders shall have a firm base and be positioned with a slope of 1:4.

12. Vertical Ladder

Vertical ladder is a type of fixed ladder, which is permanently attached to the horizontal or vertical components of scaffolding. The main criteria to consider in the use of a vertical ladder is clearance. The following clearance guidelines shall be used:

General

Safe clearances shall be maintained to prevent workers from bumping into, or snagging onto, projecting objects while ascending or descending the ladder.

Climbing Side

Ladders shall have a minimum clear perpendicular distance of 30 inches from the rungs to the nearest projecting object on the climbing side. When unavoidable obstructions are encountered, the minimum clearance distance may be reduced to 24 inches if deflector plates are provided.

Back Side of Ladder

The perpendicular distance from the face of the rung on the climbing side to the nearest fixed object on the backside of the ladder shall not be less than 10 inches. When unavoidable, horizontal obstructions (e.g., beams, pipes, etc.) are encountered, the vertical toe clearances specified in the following sections, shall apply:

Side Clearance

The minimum clear distance to the nearest fixed object shall be 15 inches on each side of the centerline of single rung ladders.

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Vertical Clearance
The minimum vertical toe clearance from horizontal obstructions shall be 1-½ inches below and 4½ Inches above the top edge of the rung.

Multiple Ladders
When two or more separate ladders are used with a landing platform, the side-step distance shall be a minimum of 15 inches from the centerline of the upper ladder to the near side of the lower ladder.

12. Workmanship
    - Scaffolding shall be erected, altered, and dismantled by experienced men working under the direction of a competent supervisor.
    - Posts shall be set accurately in place and checked vertically by using a spirit level or by using vertical lines on the building or structure.
    - Scaffolding couplers should be tightened with proper scaffolding spanners. The use of an ordinary spanner or tool giving greater leverage could damage the screw threads and render the coupler unserviceable.
    - Scaffolding materials shall not be thrown or dropped from heights.

13. Inspections
    All scaffolds shall be inspected regularly by a competent Supervisor and after adjustments, modifications, adverse weather conditions, etc. Erected scaffolds and platforms must be inspected regularly to ensure that the scaffold has not been altered and is in a safe working condition.

Tube and Coupler Scaffolds

1. Independent Tied Scaffold
   An independent tied scaffold (also commonly known as a double pole scaffold) consists of a double row of posts connected together longitudinally with runners and with bearers at right angles to the runners. Braces and ties are essential for stability. Independent tied scaffold is the most common form of tube, coupler scaffolding and is divided into three groups. The height limitation of the tube and coupler scaffold shall not exceed 12.2 meters (40 feet) unless a scaffold plan proposing to use such a scaffold at a greater heigh has been reviewed by the Clients Private Plants Affiliates, SABIC AFFILIATES and SAUDI ARAMCO.

   - Light Duty: for painting, cleaning, etc....
   - Medium Duty: when materials are deposited on the platforms.
   - Heavy Duty: where the deposited material is of a more substantial nature.

2. Light Duty Tube and Coupler Scaffolds (For general requirements, see attached Requirements Common to All Scaffolding and Fabricated Tubular Frame.

   - Design, Loading, and Dimensions

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- Alight duty tube and coupler scaffold can have up to three working platforms in use at any one time, and the maximum distributed load on the platform shall be 1.2kPa (25lbs/ft^2) with posts 3.05 meters (10 feet) apart longitudinally and 1.83 meters (6 feet) transversely. b. Platform
- The platform between posts should be decked out with 23 centimeters (9 inches) wide by 5.1 centimeters (2 inches) thick planks. Bearers may be cantilevered for use as brackets to carry not more than two planks between the building and inner post.
- Limitations - Light duty tube and coupler scaffolds erected in accordance with these directions may be used up to a maximum height of 38.1 meters (125 feet) and limited to a uniformly distributed load of 25lbs/ft^2. Light duty tube and coupler scaffolds departing from these directions shall be specially designed or designed to a higher rating such as medium or heavy duty.

3. Medium Duty Tube and Coupler Scaffold

- Design, Loading, and Dimensions
  A medium duty tube and coupler scaffold may have up to two working platforms in use at any one time. The maximum distributed load on each platform shall not exceed 2.39kPa (50lb/ft^2) with posts not more than 2.4 meters (8 feet) apart longitudinally and 1.83 meters (6 feet) transversely.
- Platform
  The platform between posts should be decked out with 23 centimeters (9 inches) wide by 5.1 centimeters (2 inches) thick planks. Bearers may be cantilevered for use as brackets to carry not more than two planks between the building and inner post.
- Limitations
  Medium duty tube and coupler scaffolds erected in accordance with these directions may be used up to a maximum height of 38.1 meters (125 feet) and limited to a uniformly distributed load of 50lbs/ft^2. Medium duty tube and coupler scaffolds departing from these directions shall be especially designed to a higher rating such as heavy duty.
- Bearers
  Bearers on medium duty tube and coupler scaffolds shall be 6.35 centimeters (2.5 inches) outside diameter steel tube and of nominal wall thickness of 0.4 centimeter (5/32 inch).

4. Heavy Duty Tube and Coupler Scaffolds
   - Design, Loading and Dimensions
     heavy-duty tube and coupler scaffold has one working platform with a maximum distributed load of 3.6kPa (75lbs/ft^2) on the platform. The posts shall be no more than 2.0 meters (6 feet, 6 inches) apart longitudinally and 1.8 meters (6 feet transversely).

   - Platform
     The platform between the posts shall be decked out with 23 centimeters (9 inches) wide by 5.1 centimeters (2 inches) thick planks.

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- Limitations
  Heavy-duty tube and coupler scaffolds erected in accordance with these directions may be used up to a maximum height of 38.1 meters (125 feet). Heavy-duty tube and coupler scaffolds departing from these directions shall be especially designed.

- Bearers
  Bearers on heavy duty tube and coupler scaffolds shall be 6.35 centimeters (2.5 inches) outside diameter steel tube and be of nominal wall thickness 0.4 centimeter (5/32 inch).

Free-Standing Tower Scaffolds

A freestanding tower scaffold consists of four or more posts connected together longitudinally with runners and bearers at right to the runners, forming a square or rectangular tower. Alternatively, a freestanding tower scaffold may be constructed of a fabricated tubular frame or system scaffolding. A freestanding tower scaffold has a single working platform and is a common form of access scaffolding for painters and others who do work of a light nature and of short duration.

1. General Requirements
   For general requirements, and where a fabricated tubular frame or system scaffolding is to be used.

2. Design, Loading, and Dimensions
   A freestanding tower scaffold shall have only one working platform and the maximum distributed load shall not exceed the load rating which is determined by the platform unit type and the scaffold duty. The height from the base to working platform of a freestanding tower scaffold shall not exceed four times the minimum base dimension. In no case shall the minimum base dimension be less than 1.2 meters (4 feet).

3. Runners and Bearers
   The vertical spacing of runners and bearers shall be 2.0 meters (6 feet, 6 inches). The lowest runners and bearers shall be as near to the base as possible. Runners and bearers shall be secured to the posts with standard couplers.

4. Bracing
   Sway bracing is necessary on all four elevations to the full height of the scaffold. Plan bracing is also required at the base, at the top, and at every third lift to prevent racking.

5. Ties
   Freestanding tower scaffolds more than 9.8 meters (32 feet) in height shall be adequately tied to a building or structure. Where tying to a building or structure is impracticable, one of the following methods of ensuring stability shall be used:

   - Guy wires at a slope of approximately 45 connected to the working platform level of the tower.

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- Bottom corners of the tower securely anchored.

6. Platform
   The single working platform of a freestanding tower scaffold shall not project beyond the base area and the platform unit(s) shall be securely fixed in position.

7. Access
   Where the means of access to the working platform is outside the tower structure, due consideration must be given to the effect of such means of access on the stability of the scaffold. Where a sloping ladder would cause instability, a securely fixed vertical ladder may be used.

8. Limitations
   Freestanding tower scaffolds erected and used in accordance with these directions and with one working platform may be used up to a maximum height of 12 meters (40 feet) to the work platform. Freestanding tower scaffolds departing from these directions shall be especially designed.

Mobile Tower Scaffolds

The requirements for freestanding tower scaffolds also apply to mobile tower scaffolds with the exception that wheels are used in place of base plates and sills.

1. Foundations
   Wheels or casters, not less than 12.7 centimeters (5 inches) in diameter, and fitted with brakes, which cannot be released accidentally, shall be securely fixed to the bases of the posts by lock pins or dowels. A mobile tower scaffold shall only be used and moved on surfaces sufficiently firm and level to ensure stability. Where the scaffold is to be used on a suspended floor, it shall be designed to apply loads no greater than the bearing capacity of the floor. Temporary foundations or track laid on soft or uneven ground to facilitate the erection and movement of the tower shall be constructed and anchored so that its bearing capacity is not exceeded due to imposed loading from the tower. The track shall be level and properly secured.

2. Operation
   A mobile tower scaffold shall be moved only by pushing or pulling at the base. Force must not be applied at a height greater than 1.4 meters (4 feet, 6 inches) above the base. No men, equipment, or materials shall be on the working platform or elsewhere on the structure while it is in motion. Wheel brakes shall be applied at all times when men are on the stationary mobile tower scaffold.
3. Limitations
   Mobile tower scaffolds, erected and used in accordance with these directions, supported on four wheels and with one working platform, may be used up to a maximum height of 12 meters (40 feet). Mobile tower scaffolds departing from these directions shall be especially designed and properly secured.

Scaffolds for Tanks and Vessels

Tube and coupler scaffolds for tanks and vessels shall be erected in accordance with. Secure tying to the structure is essential for stability.

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1. Brackets and bracket straps shall be constructed, fixed and erected in accordance with the manufacturer's instructions.
2. It is essential that the brackets, straps and welds are of sufficient strength to support the weight of the scaffold, men, tools and materials.
3. The bracket straps shall be welded to the wall of the tank by a certified welder. The weld shall be a full 5 millimeters (3/16 inch) fillet. Prior to welding on any tank, approval is required from Gas Arabia Services Consulting Services Department.
4. The weld shall be made with the same type of electrode as used for the main tank weld joints. Before the bracket is attached to the strap, the weld shall be inspected by a competent welding inspector or welding supervisor who will approve and accept the weld.
5. Brackets shall be inspected prior to each use and damaged or defective brackets shall be removed from service. Brackets shall be vertical and horizontal spacing shall not exceed 2.5 meters (8 feet) on centers.
6. A rigid guardrail system and toe-boards shall be securely fixed to the uprights of the brackets (see Requirements Common to All Scaffolding). Alternatively, $^3/8$-inch diameter wire ropes may be used in place of top-rails and mid-rails providing that they are fixed and kept taut by the use of turnbuckles.
7. Whenever men are working, the platform shall be fully decked.
8. Excessive storage or accumulation of materials or platform units (planks) shall not be permitted.
9. The scaffold shall be designed to support a minimum load of 1.2kPa (25lbs/ft^2). No more than two persons shall occupy any given 2.5 meters (8 feet) of bracket scaffold at any one time. Tools and materials shall not exceed 34 kg (75lbs) in addition to person(s) occupying the area.

Special Scaffolds

Scaffolds to suit special applications and those required for unusual heights or for use in abnormal circumstances shall be of an especial design, which has been reviewed by the Loss Prevention Department as per the provisions of Fabricated Tubular Frame and System Scaffolding). Vehicle-mounted elevating and rotating aerial devices shall comply with ANSI A92.2-1990.

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SECTION 33: CONFINED SPACE ENTRY

Confined space entry - is the entry of personnel into any space or structure like tanks, vessels, vault, excavations 4 feet deeper, manholes and other areas not normally intended for human occupancy, in which entry, movement within or exit is restricted. No employee enters a confined space without obtaining permission from his immediate superior. Work permit system shall be strictly followed in all works to be carried out in confined spaces. All works to be carried out in confined spaces shall be in accordance to client Private Sector, SABIC affiliates and/or Saudi Aramco requirements. Confined spaces present an added element of danger to the workplace.

1. Enclosures having limited mean of entry and exit such as storage tanks, tank cars, bins, boilers, and other tank-like compartments usually with only a manhole for entry.

2. Open-topped spaces not subject to good natural ventilation, more than 4 feet in depth such as pits, vault, and vessels. These open-topped spaces must be checked each day for accumulation of hazardous gases, etc.

3. Underground structures such as septic tanks, sewers, utility tunnels, and pipelines. If work is to be performed in an area such as these, the following guidelines must be followed:-

   - Obtain Work Permit.
   - Gas test must be conducted.
   - Do not enter if work can be done on top or outside.
   - Blank-off inlet a doublet lines; lock all valves in closed position and all switches in the "OFF" position.
   - Remove manhole covers or entry doors; avoid breathing vapors when removing covers; ventilate space.
   - A confined Space Entry Log is required in line with the Work Permit. This log shall be kept and completed by the standby man to log each person by NAME, I.D. Number, and time every time they enter or exit the Confined Space. Gas test made by the operations are also added to this log.

4. Purge by blowing air, steam, or both into space to be entered, to exhaust the confined space. Do not enter into the confined space until it is properly tested and certified as safe. Venting harmful vapors to a safe point of discharge preferably by a method of mechanical exhaust ventilation to avoid recirculating contaminated air.

5. Test for:
   - Combustible
   - Oxygen deficient atmosphere (carbon dioxide).
   - Carbon monoxide.
   - Other suspected toxic gases (Exposure may cause inability to smell, do not rely on your sense of smell).

6. Always put on harness and lifeline (two men "on top") when going into a manhole, a sewer, or an inadequately ventilated confined space. Continue to test air when entering any confined space. Electrical

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equipment must be explosive proof if flammable mixtures could be present. The guard stationed outside the confined space must not enter in a rescue attempt until other help has been called.

7. If the atmosphere is potentially dangerous or oxygen deficient, in addition to the harness and lifeline, wear an approved airline or self-contained breathing apparatus.

8. Always recheck air quality each day after breaks or after space has been unoccupied before entering a manhole, sewer, conduit or other confined space (Steps 1 through 7 listed previously), and keep records of test results from #5 above, made prior to all entries, and of all persons entering.

9. It is an enclosed area or space with a limited opening for entry and exit, with unfavorable natural ventilation, not designed for continuous employee occupancy.

Oxygen level:

- 23.5% above ---- causes flammable and combustible material to burn violently
- 19.5% ---------- Minimum acceptable oxygen level
- 15%-19% ---------Decreased ability to work seriously
- 12%-14% ---------Respiratory increase (poor judgement)
- 10%-12% ---------Respiratory increase (lips become blue)
- 8%-10% ----------Mental failure, nausea
- 6%-8% ----------50% fatal
- 4%-6% ----------come in 40 seconds death

Hydrogen Sulfide:

- Decomposition of a materials and human waste, dry rotten egg at low concentration, odorless at high concentration.
- 1,000ppm above ---------death in minutes
- 500ppm to 999ppm------death in 1 ½ hours
- 200ppm to 499ppm------significant irritation in 1 hour
- 50ppm to 199ppm--------mild irritation (eyes, throat) in 1 hour
- 10mm below ----------Permissible Exposure Limit in 8 hours

Carbon Monoxide:

- Odorless, colorless gas, combustion by product, quickly collapse on high concentration
- 2,000ppm to 5,000ppm ------Unconsciousness in 30 minutes
- 1,000ppm to 2,000ppm ------Slight heart palpitation in 30 minutes
- 600ppm ----------Headache discomfort in 1 hour
- 200ppm ----------Slight headache discomfort in 3 hours
- 50ppm ---------- PEL in 8 hours

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LEL

- 0% above ----------No hot work activity allowed.
- 5% to 10% ----------Use of breathing apparatus must be used.
- 10% above----------No work allowed

Confined Space refers to any place, including any vessel, tank, container, pit, bund, chamber, cellar or any other similar space which, by virtue of its enclosed nature, creates conditions that give rise to a likelihood of an accident, harm or injury of such a nature as to require emergency action due to the presence or reasonable foreseeable presence of:

- flammable or explosive atmospheres
- harmful gas, fume or vapor
- free flowing solid or an increasing level of liquid
- excess of oxygen
- excessively high temperature the lack or reasonably foreseeable lack of oxygen.

What are the key characteristics which define a confined space? The key characteristics of a confined space are:

- the space must be substantially enclosed
- there must be a risk of at least one of the hazards listed above occurring within the space
- the risk of serious injury from the hazard must be created by virtue of the enclosed nature of the space
- the potential injury must be serious and be such as to require emergency action to rescue the person involved.

The hazards associated confined spaces include:

Toxic Atmosphere

A toxic atmosphere may cause various acute effects, including impairment of judgement, unconsciousness and death. A toxic atmosphere may occur due to the presence or ingress of hazardous substances. These substances may be present in the Confined Space for various reasons such as:

- remaining from previous processing or storage
- arising from the disturbance of sludge and other deposits
- the presence of a fire or flames within the space
- seepage from improperly isolated adjoining plant
- formation during the work processes carried out in the space
- being released from under scale and in brickwork as a result of the work process.

Oxygen Deficiency

Oxygen can be lacking a confined space for the following reasons:

- displacement of air by another gas
- various biological processes or chemical reactions (such as rotting of organic matter, rusting of metals, burning, etc.)

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- absorption of air onto steel surfaces, especially where these are damp

Oxygen Enrichment

An excess of oxygen, in the presence of combustible materials, results in an increased risk of fire and explosion. Some materials, which do not burn in air, may burn vigorously or even spontaneously in an enriched oxygen atmosphere.

Flammable or Explosive Atmospheres

A flammable atmosphere presents a risk of fire or explosion. Such an atmosphere can arise from the presence in the confined space of flammable liquids or gases or of a suspension of combustible dust in air. If a flammable atmosphere inside a confined space ignites, an explosion may occur, resulting in the expulsion of hot gases and the disintegration of the structure.

Flowing Liquid or Free Flowing Solids

Liquids or solids can flow into the confined space causing drowning, suffocation, burns and other injuries. Solids in powder form may also be disturbed in a confined space resulting in an asphyxiating atmosphere.

Excessive Heat

The enclosed nature of a confined space can increase the risk of heat stroke or collapse from heat stress, if conditions are excessively hot. The risk may be exacerbated by the wearing of personal protective equipment or by lack of ventilation. No worker shall be allowed to go inside the confined space with a temperature of 50 degree Celsius.

Requirements in regard to confined space entry:

- A person shall not carry out work in Confined Spaces if it is reasonably practical that it could be avoided
- If the work must be carried out Hazard Identification and Risk Assessment must be carried out prior to the work commencing
- A person shall not enter a confined space unless there is a system of work in place that has been planned, organized, performed and maintained so as to render that work safe and without risk to health
- Anyone entering a confined space must be provided with appropriate information, training and instruction appropriate to the particular characteristics of the proposed work activities

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SECTION 34: RADIATION

GAS Arabian Services will ensure that their employees are aware of the danger and the action to be taken when there is a probability of radiation source in work areas. Handling, storage and use of this material will be totally in compliance to Gas Arabia Services requirement. In the event of radiation existence on site the following safety measures will be taken.

1. The area where radiation job to be done shall be roped off or barricaded and a minimum of four Signboards posted around the perimeter.
2. The area will be monitored with appropriate and safe distance to ensure that no other individuals entered in the radiation zone.
3. Transporting radiation sources to work locations requires a locked container and located out of the passenger compartment. The vehicle shall have radiation signs on the front and rear.
4. Radiation reading must be taken at the perimeter of the storage area and the radiation level must be with the acceptable limits. The cumulative dose must remain at acceptable limits given by Gas Arabia Services requirements.
5. Radiation signs must be fixed/install to the barrier of all storage areas. When ionized radiation is carried out it must conform with Gas Arabia Services Standards and in strict guidance of "Work Permit System" when required.

Competent Person

Competent persons are personnel who are not normally directly concerned with ionizing but who are capable of dealing with emergency situations.

Safe Distance

During the NDT testing using Iridium for steel pipe after welding, the following are the given amount of curie used with the equivalent minimum safe distance for isolation. No workers shall get close or walk within the radius of the given distance. The walking way, driveway, access including stairs shall be block and barricaded using the symbol of radiation.

10ci	25m	30ci	44.7m	50ci	57.7m
15ci	31.6m	35ci	48.3m	55ci	60.6m
20ci	36.5m	40ci	51.6m	60ci	63.2m
25ci	40.8m	45ci	54.8m	70ci	68.3m

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SECTION 35: ELECTRICAL SAFETY

GAS will monitor and ensure that all temporary electrical installations will conform to Gas Arabian Services requirements and the National Electrical Code (NEC).

Temporary Installations

Distribution of electricity on a Site is different from permanent installations. As work proceeds, the type of equipment in use changes. From excavation to above ground completion, there is a constant need for convenient means of connecting equipment. This requires a variety of voltages, phases and current in different places at different times. Load requirements will vary considerable. All temporary electrical systems shall conform to the National Electrical Code.

- GAS is responsible for the temporary electric supply system on a site and the Safety measures associated with the National Electrical Code.
- Special care will be taken to ensure that the grounding conductor remains intact. If the conducting wire breaks, the supply will not be interrupted under a ground fault condition and the system will no longer be safe.
- Special care shall be taken to ensure that the correct fuse or breaker ratings are strictly enforced and that the Ground Fault Circuit Interrupters (GFCI) is installed properly on all circuits.
- Qualified, experienced electricians must carry out all installation work. Before connecting temporary electrical installations to existing installations, prior approval must be obtained from the owner or proponent department. This is to ensure that no overloading of electrical devices will occur and system protection will not be compromised.
- A competent person must be made directly responsible for the overall Safety of the installation. Its general usage, it maintenance, and any alterations and extensions to the system should be under his control. He must be at the site whenever work is being done. Before any part of newly installed electrical system or its equipment is energized. It must be thoroughly tested. Safety can be ensured by regular inspection and maintenance.

Power Tools and Lighting

- Many injuries, fire, and explosions have resulted when extension lights with defective cords or fittings have been used or when bulbs have been broken, exposing the live filament wire to an explosive atmosphere. All electrically operated tools shall be rated and used at a voltage not exceeding 120V. The use of 220V is prohibited.
- Defective extension lights and electric hand tools shall be repaired or replaced. A defective electrical tool or cord can cause fatalities, burns or fall from height as a result of sudden electric shock.
- Portable electric tools, extension lights and cords should be inspected each time they are issued and returned.
- This is part of a tool store procedure. Frequent random checks should be made where these tools, lights, and plugs are being used on site.
- Many accidents occur when lower volt equipment is plugged into higher volts system. Before any portable tool or extension light is plugged in, the voltage required for the tool or light must be the same as the power source.
- The importance of grounding all portable tools and lights cannot be emphasized too strongly. All noncurrent carrying metal parts of any electrical equipment must be properly grounded. This will reduce the electrical shock hazard.

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- Only qualified electricians should make repairs and carry out maintenance checks. All extension lights must be fitted with protective guards.
- Only a 120-volt maximum rated AC portable lighting system must be used inside confined spaces and vessels.
- Ground fault circuit interrupters shall be used on all electrical circuits including portable power electrical supplies.
- Electrically operated tools and equipment that do not have a readable Identification Plate that clearly shows the voltage, model number, RPM, etc., shall not be used on site; site referring to both refinery and pipeline.
- All electrical extension cords shall be three (3) wire type.
- Two (2) prong electrical plugs are not allowed on site.
- All extension cords shall be inspected and color-coded.

Work-On Live Equipment

- Whenever workmen are required to work on energized equipment, the job must be planned thoroughly and included in the job specific H.I.P.
- Normal depth of underground cables varies between 46 centimeters (18 inches) and 0.9 meter (3 feet) (changes in ground level due to the work can mean that the "As-Built" depth is no longer correct). No mechanical excavations can be started after test trenches have been dug by hand and cable locations established. Unless cables have been buried deep, heavy vehicles will not be allowed to drive over them.
- A hot work permit must be obtained before beginning any work on live equipment. The permit will identify all hazards and actions required.
- All cable locations shall be initially identified with a Cable / Metal detector beforehand exposing.
- Underground cables, exposed during excavation will be assumed energized and not repositioned or moved until certified to be de-energized. Exposed buried cables in open trenches must be properly supported and the area shall be barricaded.
- All personnel involve or working on Live/Hot Electrical equipment shall wear proper personal protective equipment such as electrically insulated gloves and boots, equipped with mats, hot sticks, etc.

Hold Tags and Lockouts

In order to provide controlled security while working on energized equipment "Hold Tags and lockouts" are utilized. A "Holt Tag" is attached to the switch point of the de-energized equipment and a lock secures the switch in the "OFF" position. Key are only held by personnel listed on "Hold Tag"; coordination is maintained between the owner of the electrical facility and the GAS craftsman to ensure that all parties are aware of work in progress.

General Precautions

- All underground electric cables for portable offices and accommodations, site camps shall be laid at a safe depth as per Client Standards (a record should be kept of the layout of these cables).
- All switchgear should be mounted on rigid settings outside the portables and be encased.
- Special care should be taken to ensure that the correct fuse or breaker systems are strictly enforced. Ground Fault Circuit Interrupters (GFCI) shall be used on all temporary circuits.
- All newly installed electrical systems shall be tested before being energized.
- Regular inspections should be carried out to ensure protective maintenance could be maintained to prevent fire or electric shock.
- Portable electrical tools and extension lights shall be grounded or be double insulated.

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- Proper switches, shoes, and sockets of an approved type shall be used for flexible connections and power-driven tools.
- All portable electrical tools and equipment must not exceed 110 volts and shall be checked by a competent person prior to use. The correct plugs are to be fitted to all appliances.
- Only experienced electricians are allowed to work in all electrical activities.

Overhead Power lines and Underground Cables

GAS Arabian Services will identify all overhead power lines and install the required safety measures in compliance to Client, Power Distribution Department and/or SCECO requirements.

- Identify all overhead lines; install warning signs at these locations.
- Install "Goal Posts" at all overhead power lines.
- Attach a flag to crane boom ends when working near overhead lines.
- Spotters must be present during any operations of heavy equipment near or under the overhead power line.
- Work permit will be obtained when working near overhead lines or buried cables.
- Hand excavation must be required for exposing any underground cables.
- Secure the area by warning signs and barriers.
- Ground all equipment working under overhead power lines.
- Underground electric cables will be exposing only by using hand tools during excavation.

Underground Electrical Cables

- In an area where an underground power cable(s) is known or suspected, the location of the underground cable(s) shall be accurately marked before excavation activities begin.
- Mechanical excavators shall not be used near underground cables until after test excavations have been hand dug and the underground cable locations visibly established. Mechanical excavators shall not work within 3 m (10 ft) of any underground utility cable.
- Any underground cable that is exposed during excavation work shall be assumed to be energized and not to be repositioned or moved until it has been verified to be de-energized by an authorized/certified electrician.
- Exposed cables in open excavations shall be properly supported and the area barricaded.
- Any damage to cables during excavation/work activities shall be immediately reported to the site in charge/ engineer

Unqualified/ Incompetent person

- Those with little or no such training working on, near or with the following installations:
  - Premises Wiring: Installations of electric conductors and equipment within or on buildings or other structures, and on other premises such as yards, parking lots, other lots, and industrial substations.
  - Wiring for connection to supply: Installations of conductors that connect to the supply of electricity.
  - Other Wiring: Installations of other outside conductors on the premises.
  - Optical Fiber Cable: Installation of optical fiber cable where such are made along with electric conductors
  - Prior to beginning a task that may involve an electrical hazard, be sure you are familiar with all safety procedures.

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Damage Cables

- Electrical cords must be inspected for frays, cracks, exposed wires, and to ensure that the insulating jacket is intact. Check the plug and cord for defects and replace or repair prior to further use.

Damage Receptacle

- Check the receptacle for missing or damaged parts. Do not plug equipment into defective receptacles.

Heat Surface

- Electrical cords must not come in contact with heat sources such as pipes or radiators, hazardous substances, or sharp objects and must not be run through water.

Obstruction

- Equipment must not be placed where the electrical connection could be hit, tripped over, or walked on.

Permanent source

- Extension cords shall not be used as a permanent source of wiring.

Circuit Breakers

- Electrical utility rooms containing circuit breakers shall not be blocked with equipment, clutter, etc. Equipment/articles should not be placed within three feet of a circuit breaker.
- Employees should know the location of circuit breakers in their work area.
- Circuit breaker switches must be identified as to the equipment controlled.

Multi Plug adaptors

- Multi-plug adaptors (inclusive of extension cords, cube adaptors, and strip plugs) must meet the following requirements:
  - Nationally recognized testing laboratory approval.
  - Insertion into a properly grounded outlet and not used in tandem or in conjunction with other adaptors.
  - Current breaker overload safety device and not exceed a maximum rating of 15 amps.
  - Protection from physical damage, not affixed to structures or extended through walls, ceilings, floors, under doors or floor coverings or be subject to any damage/impact.
  - No alterations in any manner.

Repair

- De-energize electrical equipment before inspecting or making repairs. Prior to inspecting or repairing equipment, turn off the current at the switch box and lockout/tag-out the system. Accidental or unexpected sudden starting of electrical equipment can cause severe injury or death.

Plugging and Unplugging

- When plugging in or unplugging power equipment, the power switch must always be in the OFF position.
- Plugs must not be removed from outlets by yanking the cord. 13. Care must be taken when electrical equipment is used in areas where oxygen, flammable gases are present. Sparks from electrical equipment can cause a fire or explosion.

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Insulated Tools

- Insulated tools are recommended when working near energized equipment.

Personal Protective Equipment

- When working with equipment that may pose an electrical hazard, wear the proper personal protective equipment, e.g., rubber, insulating gloves; hoods; sleeves; helmets; shoes; etc.

Supervision.

- Supervisors are responsible for assuring that equipment such as radios, coffee pots, etc., meet the guidelines for proper grounding and other electrical safety standards.

Electrocuted Victim

- In the event that a fellow employee receives an electric shock, turn off the current. Do not touch the victim until he or she can be separated from the current source. Use a non-conductive item such as a wooden broomstick

Voltage

Low Voltage----------600V below
Medium Voltage----------600V to 69KV
High Voltage ----------69KV to 230KV
Ultra-High Voltage----------230KV to 1,100KV

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Photo	COLOR	L1	L2	L3	Neutral	Ground	Voltage	Amps	Phase
	Red	✓	✓	✓	✓	✓	400	16 (49mm) 32 (57mm) 63 (69mm)	3
	Red	✓	✓	✓		✓	400	16, 32, 63	3
	Blue	✓	✓			✓	220	16, 32, 63	2
	Yellow	✓			✓	✓	110	16, 32	1
	Violet	✓			✓		24	16	1

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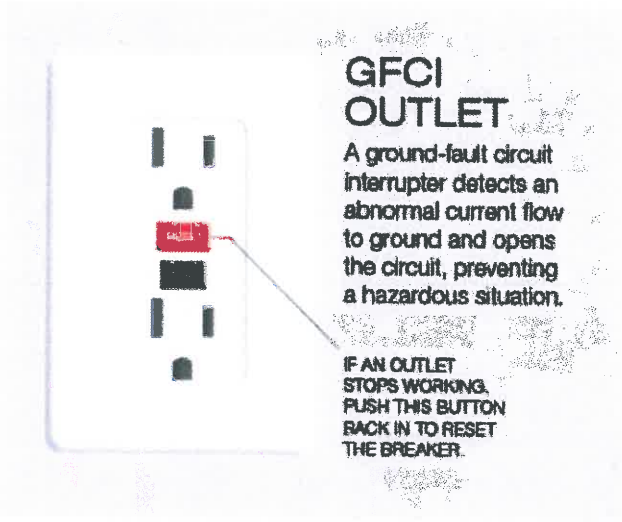
GROUND FAULT CIRCUIT INTEERUPTOR (GFCI)

The ground-fault circuit interrupter, or GFCI, is a fast-acting circuit breaker designed to shut off electric **power** in the event of a ground-fault within as little as 1/40 of a second. It works by comparing the amount of current going to and returning from equipment along the circuit conductors.



When would you use a GFCI outlet?
The NEC requires **GFCIs** on all exterior and bathroom receptacles (another term for **outlets**). **GFCIs** are also required on all receptacles serving kitchen countertops. In laundry rooms and utility rooms, **GFCIs** should be installed on **outlets** within six feet of sinks, washing machines, and water heaters

A ground-fault circuit interrupter (**GFCI**) uses a current transformer (CT) (or similar device), to detect slight current imbalances between the ungrounded (hot) and grounded (neutral) conductors that pass through it. On its own, a **GFCI does** not **offer** any purposeful type of **overcurrent**, nor **overload protection**

How many milliamps does it take to trip a GFCI?
There is a Class A GFCI that trips when a ground fault current exceeds **5 milliamps** and there is a Class B GFCI that trips when a ground fault current exceeds **20 milliamps**

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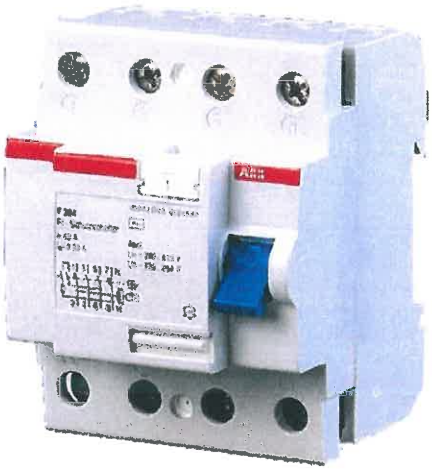
EARTH LEAKAGE CIRCUIT BREAKER (ELCB)

An **Earth-leakage circuit breaker** (**ELCB**) is a safety device used in electrical installations with high Earth impedance to prevent shock. It detects small stray voltages on the metal enclosures of electrical equipment, and interrupts the circuit if a dangerous voltage is detected.



An ECLB is one kind of safety device used for installing an electrical device with high earth impedance to avoid shock. These devices identify small stray voltages of the electrical device on the metal enclosures and intrude the circuit if a dangerous voltage is identified. The main purpose of Earth leakage circuit breaker (ECLB) is to stop damage to humans & animals due to electric shock.

An ELCB is a specific type of latching relay that has a structure's incoming mains power associated through its switching contacts so that the circuit breaker detaches the power in an unsafe condition. The ELCB notices fault currents of human or animal to the earth wire in the connection it guards. If ample voltage seems across the ELCB's sense coil, it will turn off the power, and remain off until manually rearrange. A voltage sensing ELCB doesn't detect fault currents from human or animal to the earth.

The Earth circuit is improved when an ELCB is utilized; the link to the Earth rod is delivered through the ELCB by linking to its two Earth terminals. One terminal energy to the installation Earth circuit protective conductor, aka Earth wire (CPC), and the other to the Earth rod or some type of earth connection.

Advantages of Voltage Operated ELCB

- ELCBs are less sensitive to fault conditions and have few nuisance trips.
- While current and voltage on the ground line generally fault current from a live wire, this is not continuously the case, therefore there are conditions in which an ELCB can annoyance trip.
- When an installation of the electrical instrument has two contacts to earth, a near high current lightning attack will root a voltage gradient in the earth, offering the ELCB sense coil with sufficient voltage to source it to a trip.
- If either of the soil wires become detached from the ELCB, it will no longer install will frequently no longer be correctly earthed.
- These ELCBs are the necessity for a second connection and the opportunity that any extra connection to ground on the threatened system can inactivate the detector.

Disadvantages of Voltage Operated ELCB

- They do not sense errors that don't permit current through the CPC to the ground rod.
- They do not permit an only building system to be simply divided into many sections with independent error protection because earth systems are typically used mutual earth, Rod.
- They may be skipped by outside voltages from something associated with the earth system like as metal pipes, a TN-C-S or a TN-S earth mutual neutral and earth.

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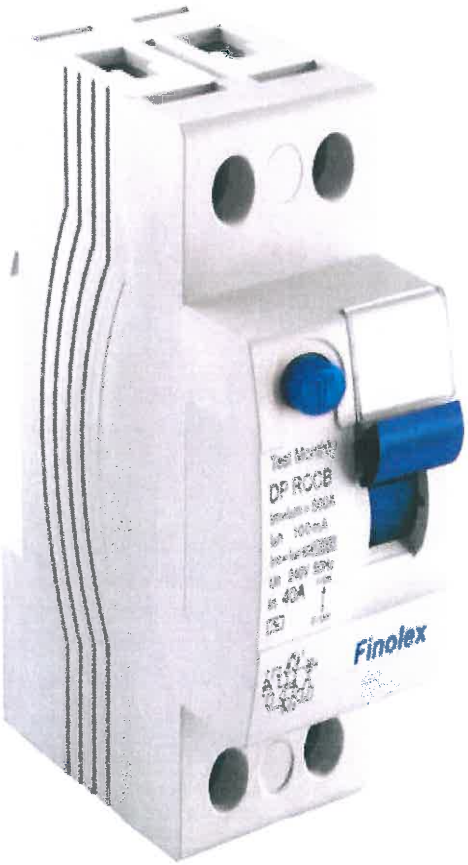
- As electrical leaky utilizations like washing machines, some water heaters and cookers might source the ELCB to trip.
- ELCBs present an extra resistance & an extra point of failure in the earth system.

What is terminal block used for?
A **terminal block** is a modular, insulated **block** that secures two or more wires together. Factories **use terminal blocks** to secure and/or terminate wires. In their most basic form, **terminal blocks** consist of several individual **terminals** which are arranged in a long **strip**.

RESIDUAL CURRENT CIRCUIT BREAKER (RCCB)

Residual Current Circuit breaker **RCCBs** are the safest device to detect and trip against electrical leakage currents, thus ensuring protection against electric shock caused by indirect contacts.



The new **RCCB** is best because it will detect any earth fault. **RCCB** will only have the line and neutral connections. **ELCB** is working based on Earth leakage current. But **RCCB** is not having sensing or connectivity of Earth, because fundamentally Phase current is equal to the neutral current in single phase.

There might be some unwanted **tripping** of **RCCB**. It's mainly because whenever there are sudden changes in electrical load, there **can** be small current flow to earth especially in appliance. **RCCB** **does** not protect from current **overload**. ... However, a current **overload** cannot be detected.

old

Firstly turn off all the circuits that are protected by the device and try to reset it. **If** it stays set, you can then turn on each circuit one by one. It may be that al the circuits will turn back on and the **RCD** will be OK, you will then have to try and identify the cause which may be as simple as a blown lamp

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Why **is earth required** when an **RCCB** is connected to the circuit? ... If we do not have **earth** of connected equipment then during some fault current will not flow to ground and current difference will not be in **RCCB** until someone will touch that equipment. Same faults can be detected earlier if we have proper **earth**.

If you encounter nuisance tripping problems, you can use an earth leakage clamp meter to measure the imbalance between the line and neutral conductors which is the total earth leakage of the system. An earth leakage clamp meter allows you to test the circuit in a safe, fast and easy way.

The new RCCB is best because it will detect any earth fault. ... RCCB will only have the line and neutral connections. ELCB is working based on Earth leakage current. But RCCB is not having sensing or connectivity of Earth, because fundamentally Phase current is equal to the neutral current in single phase

The typical ELCB/RCCB is built into a 230-volt circuit breaker and is located in the panel board. ... Because the GFCI/ELCB/RCCB operates on differential current, a ground wire is not essential to its operation. A GFCI operates equally well without a ground wire connected to it

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SECTION 36: INSTRUMENTATION

Every process instrumentation is provided with an instructional manual by the manufacturer. Neglecting the safety instructions provided in the user manual is not at all a good idea. Always remember that the manufacturer would have formulated those guidelines to ensure a safe working environment. Although there are several models of differential pressure transmitter available, the following safety precautions are almost common to all.

Authorized Personnel:
Not everyone can mount and set up a pressure transducer. It must be carried out by a person who is qualified and knowledgeable about the instrument working, components, regulations and instructions specific to hazardous areas, among others.

Appropriate Usage:
Although the pressure transmitters are manufactured for measurement of flow, level, differential pressure, still each model has a specific purpose in an application. It is important to use the instrument appropriately in its rated capacity for applications which it is intended for. Vessel overfill or damage to system components are the direct outcomes of inappropriate usage.

Appropriate Installation:
It is important for the personnel to comply with the necessary occupational safety measures at the time of unit installation. While installing, the authorized person should take good care and should not injure himself by touching the instrument or its casing. He must also ensure that the installation is in compliance with local installation requirements and the local electrical code. Checking out the installation guidelines in the user manual helps the personnel to complete the installation or disassembly safely.

Wiring:
Do not ever allow anyone to carry out wiring unless he/she meets the qualification and certain condition. The wiring should be led such that it is far from electrical noise sources, and the power supply to the instrument should be switched off during the process. The use, of appropriate stranded lead wires or cables are some of the basic yet crucial factors to consider while wiring the instrument.

Signs and Warning on the Instrument:
In addition to providing safety guidelines in detail in the user manual, manufacturers also print safety approval markings and safety tips on the device. Watch for these signs carefully

Safety precaution on temperature sensors

1. Do not touch any of the terminals while the power is being supplied. Doing so may result in electric shock.
2. Do not allow pieces of metal or wire cuttings to get inside the Temperature Controller. Doing so may result in electric shock, fire, or malfunction.
3. Do not attempt to disassemble, repair, or modify the Temperature Controller. Any attempt to do so may result in electric shock, fire, or malfunction.

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4. Do not use the Temperature Controller in locations subject to flammable or explosive gases. Doing so may result in an explosion.
5. The switching capacity and switching conditions will significantly affect the longevity of the output relays. Use the Temperature Controller within the rated load, and do not use the Temperature Controller beyond the number of operations specified under electrical life. Using the Temperature Controller beyond its electrical life may result in contact welding or burning.
6. Use Temperature Controller settings that are appropriate for the controlled system. Failure to do so may cause unexpected operation resulting in damage to equipment or personal injury.
7. Prepare a circuit with an overheating prevention alarm and implement other safety measures to ensure safe operation in the event of a malfunction. Loss of operational control due to malfunction may result in a serious accident.
8. Failure to tighten terminal screws to the correct torque may result in fire or malfunction.
9. Make sure there will be no adverse effects from the device connected to the Temperature Controller before using the hardware test mode. Devices connected to the Temperature Controller may reach a dangerous state during the test.

Mounting

1. Install explosion-proof models according to the applicable laws and regulations regarding explosion proofing.
2. Sheathed Temperature Sensors with long protective tubing are coiled for shipping. Straighten the tubing by unwinding it in the opposite direction, without twisting it.
3. Do not excessively bend the section connecting the protective tubing to the lead wires of exposed-lead wires models. Do not insert this section into the sensing object.
4. Do not pull the lead wires with force. Doing so may cause broken wires at the connected section.
5. When measuring at high temperatures that cause the protective tubing to warp, either insert the Temperature Sensor vertically or use an appropriate means to hold the Temperature Sensor in place.
6. To obtain more accurate values, maintain the temperature of the exposed protective tubing to prevent heat loss through heat dissipation.
7. If inductive noise is generated in the Temperature Sensor due to power lines or other source, either change the installation position of the Temperature Sensor and lead wires or provide a shield for the lead wires.
8. Use airtight Temperature Sensors for applications using sensing objects below room temperature, to prevent condensation within the protective tubing and faulty insulation.
9. Do not use the Temperature Sensor in locations that may expose the terminals to water or other liquid.
10. Temperature Sensors are precision devices. Do not subject the Temperature Sensors to shock. Take particular care with products that have ceramic components (ceramic protective tubing, platinum resistance thermometers).
11. Do not use ultrasonic cleaning or otherwise subject platinum resistance thermometers to extreme vibration. Doing so may cause wires to break within a short time. For such environments, consider using sheathed thermocouples, which have a superior vibration-resistant compared with platinum resistance thermometers and may be more suitable for the required application, depending on the level of vibration.
12. The life of the protective tubing will be significantly shortened when measuring the temperature of dissolved metals. Select protective tubing material to suit the type of dissolved metal to be measured.
13. Use the following installation methods for applications measuring the temperature of fluids.

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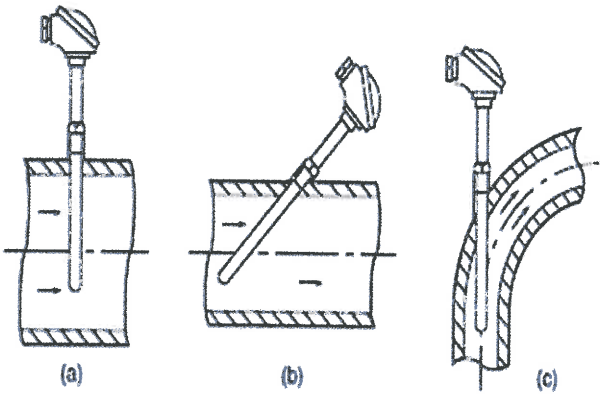
14. (a)Install the Temperature Sensor vertically to the flow in tubes with relatively large diameters that enable deep insertion.
15. (b)Install the Temperature Sensor on a diagonal against the flow in tubes with slim diameters that do not enable deep insertion.
16. (c)Install the Temperature Sensor into the convex section of a bend if the tubing diameter is even thinner than in (b).
17. Use an installation design that provides sufficient strength margin



Safety precaution on safe use of Pressure and Flow Sensors

1. **Withstand Pressure**
   Do not apply a pressure higher than the rated withstand pressure. Applying a pressure higher than this may cause damage.

2. **Operating Environment**
   Do not use the products in an environment where there are explosive or inflammable gases.

3. **Power Supply Voltage**
   Do not use a voltage that exceeds the power supply voltage range. Using a voltage that exceeds the range may cause burning.

4. **Load Short-circuiting**
   Do not short-circuit the load. Doing so may cause explosion or burning.

5. **Incorrect Wiring**
   Be sure that the power supply polarity and other wiring is correct. Incorrect wiring may cause explosion or burning.

When using a Sensor that supports non-corrosive gas as the applicable fluid, use an air filter to remove moisture and oil from the gas.

1. Do not insert any wire or other object into the pressure port. Doing so may damage the pressure elements and cause a malfunction.
2. Mount the Sensor so that it is not subject to ultrasonic vibration.
3. The cable can be extended to a maximum of 10 m. For details, see the output impedance section on the previous

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SECTION 37: LIFTING OPERATIONS

Competence

Lifting Operations shall be supervised and carried out by competent persons. Competent requirements are set out below:

- Lifting Operations shall be supervised by a competent Lifting supervisor/ Rigger 2 and or Rigger 1..
- Rigging of Lifting equipment, slinging of loads, signaling of Cranes will be undertaken only by trained and competent persons. All riggers, Slinger/Signalers shall hold a valid training certificate in the relevant discipline.
- Where relevant Operators of a mobile Lifting appliance (crane) shall hold a national driving license for the class of mobile appliance.
- General users of Lifting accessories/equipment (lifting gear) shall be trained in the safe operation of the specific make and model of equipment and associated accessories.
- Specialist Operatives responsible for the assembly and disassembly of Lifting equipment (e.g. Tower Cranes / Crawler Cranes) shall be competent and trained in the safe system of work for the assembly and disassembly of the specific make and model of equipment.
- The GAS ARABIAN SERVICES CO. LTD. project HSE team in conjunction with supply partners shall establish documented training records for Lifting equipment, Operators, Riggers and Slinger/Signaler.

1. **Rigger Level 3 (Basic):**
   A Certified Rigger Level 3 can perform rigging tasks when the load weight and center of gravity have already been established and the rigging configuration has been provided or is known by the Rigger, through experience or on-the-job training prior to the Lifting activities. Specifically, Level 3 Riggers should be able to demonstrate or have knowledge of how to:
   - Inspect Lifting/ rigging equipment before and after use
   - Identify and attach Lifting/rigging equipment with basic knowledge of hitch configurations, capacities and basic knots
   - Recognize safe Lifting angles
   - Signal operations
   - Use various types of Lifting/rigging equipment and basic hitches and their applications
   - Rigger Level 3 – Up to 10T, whilst continuing to learn and adapt to heavier Lifts

2. **Rigger Level 2 (Standard):**
   In addition to knowing and demonstrating Rigger Level 3 knowledge and skills, a Certified Rigger Level 2 can select Lifting/rigging components and procedures based on the load capacity. A Rigger Level 2 can perform the following rigging tasks:
   - Estimate load weight(s) and center of gravity
   - Identify Lifting Points
   - Determine and select Lifting/rigging equipment based on loading
   - Perform pre-use inspection of Lifting/rigging equipment and Lifting Points
   - Identify and attach Lifting/rigging equipment with knowledge of hitch configurations and safe Lifting angles, equipment capacities, and load integrity
   - Understand load dynamics and associated hazards
   - Rigger Level 2 – Up to 40T, whilst continuing to learn and adapt to heavier Lifts

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3. **Rigger Level 1 (Complex or Advance):**
   In addition to knowing and demonstrating Rigger Level 3 & Level 2 knowledge and skills, a Level 1 Rigger can perform the following Lifting/ rigging tasks unsupervised:
   - Carry out basic calculation of angles and sling tension
   - Formulate a Lifting Plan
   - Define Lifting Operations and equipment terminology
   - Direct Crane by hand signals and or 2-way radio
   - Identify common unsafe practices and probable consequences
   - Identify safe and correct use and pre-use examination of Lifting/rigging equipment
   - Plan routine Lifting Operations and understand requirement for non-routine/ Complex Lift planning
   - Understand relevant legislation applicable to Lifting Operations
   - Understand basic functions and safe working practices for offshore pedestal Cranes and overhead traveling Cranes
   - Understand care and storage requirements
   - Understand the requirement of a Lifting Operation risk assessment
   - Rigger Level 1 – All loads, including Complex Lift

4. **Lifting Supervisor:**
   A certified Lifting Supervisor should have a clear understanding of the following:
   - Legislations on Lifting Operations
   - Roles and duties of personnel involved in Lifting Operation
   - Safe Working Procedures
   - Planning for safe Lifting Operations
   - Safe use of Cranes
   - Safe use of other Lifting ancillaries
   - Basic slinging methods

As a certified Lifting Supervisor, he is responsible for the following tasks:

- Formulating a Lifting Plan
- Estimating load weight and center of gravity
- Identify relevant information relating to different types of Lifting accessories/equipment (lifting gear) i.e. markings, dates, certificates etc.
- Verify the personnel involved in the Lifting Operation are competent and trained
- Identify Lifting angles & points
- Determine the Lifting accessories/equipment (lifting gear) to be used and factors of safety
- Identify common unsafe practices and probable consequences
- Identify safe and correct use and pre-use examination of Lifting/rigging equipment
- Identify the proximity hazards during Lifting Operation
- Communicate the Lifting Plan to all personnel involved in the Lifting Operation
- Prepare an area, with exclusion zones, from the Lifting Plan, ensuring safe access/egress routes before, during and after Lifting Operation

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- Confirm that the ground conditions are suitable for the load.
- Control the Lifting Operation using legislation on Lifting Operations, L.O.L.E.R, Safe Work Procedures & Lifting Plans

Safety precautions on lifting using cranes

- All crane operators shall be properly licensed and certified for the crane type/model they are using.
- Appropriate work permits shall be issued for crane operations
- Crane operators shall have the final decision on crane lifts that affect the safety of the crane.
- Cranes shall be inspected by the crane operator prior to each shift.
- All cranes shall have a valid crane inspection sticker issued by approved third-party certifying entity.
- Crane cabs shall provide maximum visibility (e.g., curtains/cardboard shall not obstruct the operator's view during operation). Cabs shall be kept clean and clear of items such as rubbish and loose tools. Windows shall be kept clean at all times and shall be replaced if the glass becomes pitted, cracked or broken.
- All riggers shall be certified by a third-party certification body as applicable. Only certified riggers shall rig loads to be lifted, including transport trucks and boom trucks. The rigger shall have responsibility for coordinating activities of all personnel involved with the lift.
- Personnel with both crane operator and rigger certification shall not be allowed to act in both capacities for the same lift (e.g., such a person shall not supervise/rig a lift while operating a crane).
- Crane lifts shall not be performed in wind speeds exceeding 32 km/h (20) (17.4 knots) (9 m/sec), unless otherwise specified by the crane manufacturer.
- Crane lift areas shall be barricaded and secured. Only authorized personnel shall be permitted inside the barricaded area. Warning signs shall be placed at barricaded perimeters warning site personnel of the hazards of overhead lifting activities.
- All cranes shall be levelled in accordance with manufacturer's specifications and shall be located on a properly compacted foundation prior to performing any lift. All cranes shall be provided with a fixed bull's eye level and/or a carpenter's level to verify the crane is level.
- During a lift, the crane's outriggers shall be fully extended and lowered to raise the wheels and level the crane, unless otherwise specified in the crane manufacturer's load chart. The crane's wheels shall be raised completely off the ground
- Outrigger mats shall be used under all crane outrigger float pads during crane lifts. Outrigger mats shall be designed to support the total weight of the crane and load to be lifted.
- Mats shall not be permanently secured to the outrigger pads.
- Tag lines shall be used to control suspended loads, unless their use may cause a greater hazard. Tag lines shall not be tied around the hand/wrist. They shall be fully gripped by all fingers.
- The crane operator shall not leave the controls at any time while a load is attached.
- Crane operators shall only pick-up loads when the boom head and hook is at the center of gravity directly over the load.
- All crane lifts shall be partially lifted (e.g., floated for at least 3 seconds) to ensure rigging and lift integrity prior to proceeding with the actual lift.

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- A designated signalman shall be used at all times during the lifting, moving and setting of a load. Only one designated signalman shall give signals to the crane operator. Universal hand signals shall be used. In the event that the crane operator cannot see the signalman, radio communications shall be used.
- When a crane is operating near an energized power line, a designated signalman shall be assigned to ensure the following minimum distances are maintained.

Up to 50,000 volts ----------3.0 meters/10 feet
50,000 to 250,000 volts ----------6.1 meters/20 feet
Over 250,000 volts ----------7.6 meters/25 feet

- Personnel shall not ride a hook or auxiliary headache ball at any time. Personnel shall not ride the load during the lift.
- Welding on or modification of hooks and other lifting equipment is strictly prohibited.
- Cranes shall be secured during high winds or after working hours by snubbing to structures, laying down lattice booms, withdrawing hydraulic boom extensions or according to manufacturer's specifications.
- Crane travel on highways and outside plant areas shall be with the normally mounted boom sections only. All hydraulic cranes shall have boom sections fully retracted, jibs removed or stowed, and hook blocks secured.
- A positive locking device shall be engaged to prevent the boom from swinging during travel.
- For cranes fitted with retractable suspension units, the suspension shall be level before traveling.
- Hydraulic cranes traveling inside plant facilities with more than the normally mounted boom sections shall not travel a distance more than 1 km (0.6 miles).
- Lattice boom cranes traveling inside plant facilities shall be permitted without boom disassembly and on the same job, providing the movement is less than 1 km (0.6mile) and the crane is escorted at the front and back.
- Cranes traveling inside plant facilities shall be assisted by a flagman to ensure the boom tip is clear of any obstruction.
- Cranes shall not be used to drag a load along the ground.
- Cranes working near trenches and excavations shall be at the minimum clearance of 3 meter or 10 feet away from the pipes, cables and 1.8 meters or 6 feet away from excavation and trenches.
- Cranes shall be provided with a 30 m (100 ft) tape measure to assist with crane positioning and determining the crane's exact working radius.
- Cranes shall have a minimum tail swing clearance of 0.6 m (2 ft).
- Barricades shall be provided at the crane's working radius when working around personnel.
- Internal combustion engines shall be equipped with spark arrestors.
- Having a certified Rigger-I in charge of actual lift coordination.
- Drilling and workover operations involving the maneuvering of bottom hole assemblies
- Wire rope slings shall not be used for lifting operations if kinked, significantly rusted, the core is visible or more than 5% of the individual wire strands are broken. The Lifting Supervisor or Rigger shall determine when to withdraw a wire rope sling from use
- On the rare occasion of thunder and lightning, the Crane jib shall be immediately retracted and ALL Lifting Operations cease.
- Crane Lifting Operations shall be suspended when weather / environmental conditions deteriorate. Lifting Operations will be suspended in the following circumstances:

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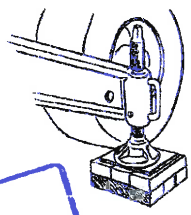
- The Crane Operator must be able to see either the load or the Slinger/ Signaler. If environmental conditions prevent this then Lifting shall be suspended. Visibility may be adversely affected by fog, sandstorms or heavy rain.
- Tag lines shall be used to control suspended loads, unless their use may cause a greater hazard. Tag lines shall not be tied around the hand/wrist. They shall be fully gripped by all fingers.
- The crane operator shall not leave the controls at any time while a load is attached.
- Lifting accessories/equipment (lifting gear) shall display the safe working load (SWL).
- All loads shall be secured and balanced before Lifting. Ratchet straps, banding and or cargo netting may be used.
- Crane cabs shall provide maximum visibility (e.g., curtains/cardboard shall not obstruct the operator's view during operation). Cabs shall be kept clean and clear of items such as rubbish and loose tools. Windows shall be kept clean at all times and shall be replaced if the glass becomes pitted, cracked or broken.
- Cranes traveling inside plant facilities shall be assisted by a flagman to ensure the boom tip is clear of any obstruction.
- Web slings shall not be used for Lifting Operations if there are significant cuts, snags, holes or damage. The Lifting Supervisor or Rigger shall determine when to withdraw a web sling from use.

- A copy of 3rd party inspection and test certificates shall be maintained for all Lifting accessories/equipment (lifting gear).
- Lifting accessories/equipment (lifting gear) shall be color coded on a quarterly basis to ensure that only certified equipment is in use on the site. A color tag shall only be attached to accessories/equipment (lifting gear) that has a valid test/inspection certificate.
- Crane travel on highways and outside plant areas shall be with the normally mounted boom sections only. All hydraulic cranes shall have boom sections fully retracted, jibs removed or stowed, and hook blocks secured.
- Internal combustion engines shall be equipped with spark arrestors.
- Exclusion zones shall be implemented for all Lifting areas. Exclusion zones shall be clearly signed and demarked with warning tape or hard barriers to prevent inadvertent access. Slinger/Signalers shall ensure that general workers are moved out of the barricaded area to prevent incidents of walking, standing or crossing under a suspended load. All Slinger/Signalers shall be issued a whistle for warning general workers of Lifting Operations in progress.
- Crane Operators shall not exceed the Crane capacity and shall immediately cease operations should automatic warning devices activate.
- Outrigger mats (grillages) shall be used on ALL Mobile Cranes to increase the surface area of the load.
- All Mobile Cranes shall extend outriggers fully before commencing Lifting Operations. All Crane warning devices/ safe load indicator (SLI) and rotating beacon lights shall be in full working order prior to commencing Lifting Operations.



Critical Lifts:

- When any part of a crane whose boom or boom attachment is to be within 10 m (33 ft) of any populated/traffic areas. This includes cranes having to suspend a load over pedestrians, vehicle traffic, occupied equipment's or occupied buildings.
- When any part of a crane whose boom or boom attachment is to be within 10 m (33 ft) of a railway line.

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- When any part of a crane whose boom or jibs attachment is to be within 10 meters or 33 feet of hydrocarbon or pressurized piping. This includes cranes to suspend a load over a vessel, piping or equipment containing hydrocarbons, steam and other pressurized liquids.
- Requiring an attachment to the main boom.
- When any load is 36,300 kg (40 tons) or greater.
- On rubber or pick-and-carry lifts.
- Any load that exceeds 85% of the crane's rated load capacity or manufacturer's specifications for that specific lift.
- Occurring at night (i.e., between sunset and sunrise).
- When an explosion, fire or high heat hazard is present.
- When the crane is operating near energized power lines.
- Involving high level or long reach lifting.
- On barges, vessels or hydrocarbon-loading piers.

Tailing, tandem (multiple) or turning lifts shall require:

- De-rating of all involved cranes by 25% of the load chart.
- Utilizing cranes of the same size, manufacturer and model, if possible, for tandem (multiple) and turning lifts.
- Having a separate, approved Critical Lift Plan on-site prior to the lift each time one of these types of lifts is performed.
- Having a certified Rigger-I in charge of actual lift coordination.
- Drilling and workover operations involving the maneuvering of bottom hole assemblies

RECOMMENDED SLINGING METHODS

The guide below contains only basic information. Exact Slinging techniques should be determined by the Rigger under the instruction of the competent Lifting Supervisor or a Rigger 2 or 1. Project HSE staff should check that Slinging techniques are broadly in line with this SWP and that the overuse of fabric straps is minimized particularly were chain slings or wire rope slings are recommended.

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SECTION 38: LIFTING EQUIPMENT AND GEARS

GAS will ensure that only authorized and trained employees will operate all lifting devices and its necessary rigging attachments. Prior to performing any lift, operators shall determine the weight of the object being lifted and ensure that slings and other devices have sufficient strength to support the weight of the load.

Workers will not be allowed to extend any part of their body under the load during lifting operation. Tag lines will be used to guide and control the load where excessive movement is possible.

All rigging devices shall meet the applicable standards for design. Proper maintenance and inspection program will be implemented prior to use any rigging device to ensure they are in good operable condition. Written records of all inspection results will be available for review. GAS will ensure that all rigging equipment, its usage, storage and inspection shall be in compliance to client and/or Saudi Aramco requirements.

Inspection and Test
General Lifting accessories and equipment (lifting gear) typically found on GAS ARABIAN SERVICES CO LTD. projects is detailed in the tables below.

The following definitions shall be applied:

Inspection– Visual pre use and / or monthly inspection of equipment by the Operator / competent person.

Examination – Visual inspection by a competent 3rd party.

Test – load test by competent 3rd party (proof load).

The specified inspection and test frequencies shall be maintained by GAS ARABIAN SERVICES CO. LTD. subcontractors. Where more stringent standards are specified in contractual requirements then the contractual requirements shall take precedence.

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LIFTING EQUIPMENT Mandatory Inspection & Certification Requirements

1	Truck Mounted Crane	
2	Rough Terrain Crane	
3	Boom Truck	
4	Electric Overhead Traveling (EOT) Crane	

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LIFTING GEARS Mandatory Inspection & Certification Requirements

1	Bow Shackle	
2	D Shackle	
3	Eye Bolt	
4	Chain Sling	
5	Chain Block	
6	Wire Rope Sling	
7	Web Sling	

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SECTION 39: HAND TOOLS and MEASURING TOOLS

Hand tools are those tools for which the hand provides the motive force, e.g., picks, shovels, axes, crowbars, wrenches, saws, chisels, hammers, screwdrivers, etc. It is the Company's duty to ensure that his workmen are properly instructed in the selection and use of the correct tool for the job. Tools constructed of good quality materials should always be used. Poor quality tools increase the risk of accidents and also reduce the efficiency of work. Power tools, however, allow many jobs to be carried out more efficiently and greater speed and accuracy. The correct use of power tools can only be achieved by the proper training of workmen, by proper maintenance, and by adequate site supervision. Many accidents have occurred because unskilled and untrained labor has been allowed to operate tools in an incorrect manner.

1. Quality
   It is the responsibility of the company to ensure that the finest quality tools shall be provided for all jobs where hand tools are used.

2. Repair and Storage
   All hand tools shall be regularly inspected before and after use, and before storage. If wear or damage is observed, the tool should be withdrawn from use for repair or disposal. The Company shall ensure that the storekeeper maintains a record of all tools issued, repaired and withdrawn from use. Proper racks and boxes shall be provided for the storage of hand tools.

3. Selection
   Using an incorrect tool for the job causes the majority of accidents. It is essential that the correct type, size, and weight of tool should be decided upon before any work is carried out.

4. Non-sparking type tool.
   Non-sparking", "spark reduced", "spark-resistant" or "spark-proof" tools are names given to tools made of metals such as brass, bronze, Monel metal (copper-nickel alloy), copper-aluminum alloys (aluminum bronze), or copper-beryllium alloys (beryllium bronze).

   Since that Gas Arabian Services are offering maintenance and extension projects in a LIVE Petrochemical Plant, the company commits to safety, which means that it will prefer and prioritize the tools to procure and the tools to be used which are non-sparking from impact.

   Iron or steel hand tools may produce sparks that can be an ignition source around flammable substance. Where this hazard exists, spark-resistant tools made of non-ferrous materials should be used where flammable gases, highly volatile liquids, and other explosive substances are stored or used

Competent Person

- A trained, capable, knowledgeable and experience user of hand tool shall only allow to use it.

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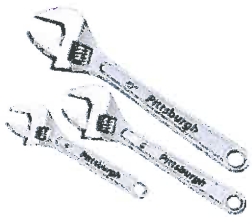
Safety Procedures:

- The user shall visually check the hand tools needed as per required in the work permit. The user shall inform the Permit Receiver/ Site Supervisor/ Foreman and Safety Officer of the damage, malfunction and missing safety accessories of the hand tool.
- The user shall not use the hand tool when safety the required insulation in the handle is missing, or when some part of the hand tool has signs of split, cut, deformed.
- The user shall use safety accessories for tools like nail holder, finger saver tool and tool holder etc. when it is available and practically reasonable to use.

Allen Wrench		Philip Screw	
Allen Key Socket (Metric & Imperial)		Needle File	
Open & Close Spanner		Wire Brush	
Adjustable Wrench		Oil Stone	

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Teflon Hammer		Feeler Gauge	
Screw Driver Set		Spirit Gauge	
Teflon Seal Remover Puller/ Pusher		Dial Indicator	
Pliers		Inside Micrometer	
Chisel		Outside Micrometer	
Brass Hammer		Vice Grip	

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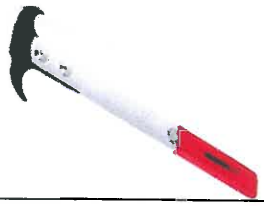
Hammer Wrench		Rubber Hammer	
Scraper		Oil Seal Slide Hammer Puller	
Scriber		Electrical Tape	
Mag Base		Seal Puller	
Meter Tape		Teflon Tape	

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SECTION 40: POWER TOOLS

General:

- The Company shall ensure that all portable power tools do not exceed 125 volts rating, are manufactured of sound materials, and are free from defects and properly grounded.
- All portable power tools shall be stored in clean, dry conditions. All tools shall be returned to the storekeeper completion of each individual job. Power tools must not be left lying around the jobsite where they could be damaged.
- Rotating tools should be switched off and held until rotation has completely stopped before they are set down. Tools must be disconnected before changing bits, blades, cutters, or wheels.
- Power for tools can be supplied by compressed air, explosive cartridge, or electricity. All portable power tools must be equipped with properly functioning **"Dead-Man Switches"**. Trigger locking buttons shall be disabled/removed.
- It is the responsibility of the company to ensure that the finest quality tools shall be provided for all jobs where power tools are used.
- All power tools shall be regularly inspected before and after use, and before storage. If wear or damage is observed, the tool should be withdrawn from use for repair or disposal. The Company shall ensure that the storekeeper maintains a record of all tools issued, repaired and withdrawn from use. Proper racks and boxes shall be provided for the storage of hand tools.
- Using an incorrect tool for the job causes the majority of accidents. It is essential that the correct type, size, and weight of tool should be decided upon before any work is carried out.
  - Any powered tool designed with guards and handles shall be equipped during use.
  - Electrically operated tools without readable labels showing voltage, rpm's, serial number, etc., shall not be used.
- All uninsulated metal tools are conductors of electricity. Where work takes place on or near electrical operations, only properly insulated and non-conductive tools should be used. A competent electrician should check insulation at regular intervals.
  - Electrically operated tools shall be plugged into a Ground Fault Circuit Interrupter (GFCI).
  - Electrically operated tools shall have a 3-wire ground cord and 3-prong ground plug when the body of the power tool is made of a conductive metal casing.
  - Electrically operated tools shall have 2 wires cord and 2 prong-plug is when the body of the power tool is made of a non-conductive casing such as plastic/ fiber glass/ rubber insulation
  - Electrical cords of the power tools and extension cords shall be double insulated.
  - Double insulated tools shall bear a Underwriter Laboratory (UL), Factory Manual (FM) or other recognized laboratory label.
  - No modified job-made extension cord shall be used. All extension cords shall bear a UL or FM label.

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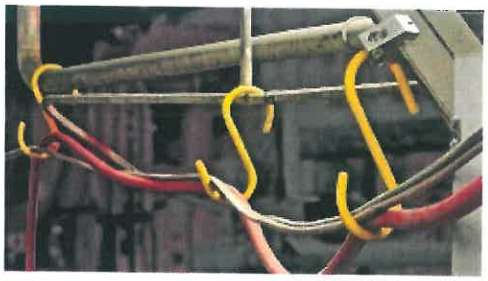
Competent Person

- A trained, capable, knowledgeable and experience user of power tool machine shall only allow to use it.
- The user shall visually check the power tools needed as per required in the work permit. The user shall inform the Permit Receiver/ Site Supervisor/ Foreman and Safety Officer of the damage, malfunction and missing safety accessories of the power tool.

Safety Procedures

- Always follow the manufacturer's recommendations to make sure the spindle wheel does not exceed the abrasive wheel specifications.
- Make sure before using, the power tool is equipped with handle bar and wheel guard cover.
- Make sure the RPM of the disk is greater than the RPM of the power tool.
- Check signs of cuts, damage and splits along the electrical cords, if found, remove it, don't use it and replace it with a good condition.
- Arrange the power tool cables and extension cables by hanging it and securing it to avoid trip and slip and fall.
- When the electrical cable is not practical to hang due to the lacking of connecting points, laid down on the ground with warning tape for early warning. Make use of a wooden plank between when necessary.
- Hang the electrical cables using cable tie, rope, scaffolding tube, plastic / steel hangers and other similar in nature when there is an available connecting points.



in

- Use an electrical female and male socket designed against water sprinkler and or submersible type socket when the power tool is used outdoor.
- Power tool machine shall be Underwriters' Laboratories (UL) listed or Factory Manual (FM) approved or its equivalent and shall bear the appropriate trademark.

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Die Straight Grinder for cleaning/ buffing metal surface.	
Wire Wheel	
Buffing Wheel	
Twist Knot Wire Wheel Cup	

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SECTION 41: PNEUMATIC TOOLS

General:

- An air compressor shall always be under the supervision of a competent person. It should always be sited in such a place so as to have adequate ventilation. Compressors shall not be permitted to operate in confined spaces without the provision of adequate exhaust ventilation.
- All compressed air hose shall be of the correct size to fit the tool being used. Any joint in the hoses shall be made with a proper coupler and secured by wipe plash arrestors. The hose length shall be kept as short as possible and placed so as not to be subjected to damage.
- Pneumatic tools require clean air to operate efficiently. In every line feeding a power tool, there shall be an adequate filter and lubricator.
- During operation, all air tools should be held firmly to prevent them from spinning and jumping. This pressure should be maintained during the stopping process to prevent injury to the operator's feet and hands.
- The uses of Pneumatic Tools require the use of safety glasses and hearing protection at all times during use.
- Use all safety accessories like handles and cover guards.
- Wear the required/ appropriate / prescribed personal protective equipment properly.
- Do not exceed to the manufacturers' safe operating pressure for tools, hose, pipe, valves or fittings.

Selecting the Competent Person

- A trained, capable, knowledgeable and experience user of pneumatic tool machine shall only allow to use it.
- The user shall visually check the pneumatic tools needed as per required in the work permit. The user shall inform the Permit Receiver/ Site Supervisor/ Foreman and Safety Officer of the damage, malfunction and missing safety accessories of the pneumatic tool.

Set up

- Compressed air hose joints (twist lock fittings) shall be secured using the correct twist lock procedures to prevent from being inadvertently disconnected between the hose and pneumatic tools.
- Install a whiplash arrestor connecting the main air pipe and the hose.
- Hose lengths shall be kept as short as possible and placed so they are not subject to damage (e.g., not crossing active roadways or walkways).
- When the air hose is not practical to hang due to the lacking of connecting points, laid down on the ground with warning tape for early warning. Make use of a wooden plank in between when necessary.
- Hang the air hose using cable tie, rope, scaffolding tube, plastic / steel hangers and other similar in nature when there is an available connecting points.
- Compressed air used for cleaning mechanical membrane, piping, , mechanical parts, formwork and steel membrane etc., shall be less than 30 psig.
- pressed air systems operating at or above 30 psig nozzle pressure shall have a relief device and/or air ports installed on the nozzle that limit the nozzle pressure to less than 30 psig if the air system becomes dead ended (e.g., inadvertently pressed against an object or person).
- Secure the hose and the main valve or manifold using a whiplash arrestor.

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Inspection

- Always follow the manufacturer's recommendations to make sure the spindle wheel does not exceed the abrasive wheel specifications.
- Make sure before using, the pneumatic tool is equipped with handle bar, left or right or top. The user will have a strong grip of handling it.
- Install the cover disk guards cover to block the rotating abrasive wheel.
- Make sure the RPM of the abrasive wheel/ disk / brush is greater than the Spindle wheel.
- Make sure to inspect the pneumatic tool with the presence of an updated monthly color coding and client inspection approval sticker.
- Compressed air hoses shall be the correct size and rating for the tool being used.
- Air hoses shall have a higher rating capacity between the source of air valve, air-compressor and manifold.
- The user shall not use the pneumatic tool when safety accessories is damage or missing.

Air Die Grinder/ Straight Grinder for cleaning the hard to reach corners/ edges of the metal surface.	
Air Die Grinder/ Straight Grinder for cleaning the flat metal surface.	

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SECTION 42: HYDRAULIC TOOLS

1	**Hydraulic Torque Wrench** Hydraulic torque wrenches are "double acting" tools that fasten and loosen bolts. They operate through the force of a hydraulic flow that provides pressure to force the wrench in a rotary motion. After a few minutes of use, most people will find out that it is not difficult to operate a hydraulic torque wrench. However, operators should be cautious when using this high power device as it can be dangerous	
2	**Hydraulic Hand Pump** Hydraulic hand pumps do not need electric power to enable them to operate meaning you can work independently from a power source making them extremely portable. These hand pumps manually transfer fluids and are a practical solution for pulling, pressuring, leveling.	
3	**Hydraulic Jack** Hydraulic jack is sometimes used in supporting the pulling of hub when special tool is present.	

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SECTION 43: SPECIAL TOOLS

1	**Mechanical Bearing Clamp Tool** Mechanical bearing clamp tool is used to hold the heated/ hot bearing to insert to the shaft.	
2	**Mechanical Press Tool** The mechanical press transforms the rotational force of a motor into a translational force vector that performs the pressing action. Mechanical presses are used for sheet metal blanking, piercing, forming, drawing, and glassmaking. To create the intricate embossed designs on the coins below, a punch press forces two plates together which deform blank pieces of metal. Hot and cold forging methods can also be used.	
3	**Hydraulic Bearing Puller** The hydraulic bearing puller is a device which is used for removing bearing from the shaft. In the machine the press fit operations are very complicated to align the assembly. For this type of operations, we require heavy force for disassembly of the bearing from the machines	

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4	**Hub Puller** The hub puller is ideal for pushing the drive axle out of the wheel hub center, or for pulling the hub off of the drive axle, OTC, a SPX Brand, said. ... "Applying heat or directly striking the axle and/or hub components typically results in damage and requires replacement.	
5	**Heat Induction Machine** Induction heaters are ideal for mounting bearings. You can use them to preheat bearings to about 120 degrees C. A higher temperature is harmful to the bearing. After this you can easily mount the bearings on the shaft.	
6	**Bolt Heat Induction** Expanding bolts with induction is the proven time- and labor saving alternative to inefficient flame and resistance heating. With induction, a specially designed coil is inserted into the bolt. Rapid, precisely controlled and localized heat is then induced directly in the bolt. The heat expands the bolt by an exact, pre-decided length, making it easy to remove the nut.	

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SECTION 44: MATERIAL HANDLING AND STORAGE

1	**Forklift** Used in shifting the parts of Gearbox, Motor from site to laydown area and vice versa.	
2	**Hand Pallet** Used in shifting the small parts of rotating equipment's from site to laydown area and vice versa.	
3	**Timber Mat** Used in the laydown of heavy mechanical parts such as turbine cover.	
4	**Wooden Pallet** Used as a landing for material and spare parts.	

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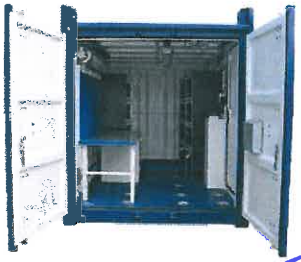
5.	**PLASTIC SHEETS** Use to cover any opening such as small bore for instrument and electrical to protect from moist and being wet. Also use to cover spare parts and other supplies	
6.	**Plastic Container** Used to organize all small bolt/ nuts and stud, and others supplies.	
7.	**Tarpaulin Sheet** Used to cover the spare parts and mechanical components such as bearing, labyrinth, etc.	
8.	**Tool Box** Use in safe keeping all the hand tools, power tools and pneumatic tools	
9.	**Tool Container** Use in safe keeping all the hand tools, power tools and pneumatic tools.	

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SECTION 45: SUPPORT MACHINERY AND CHECKLIST

1	**Mobile Air Compressor** Mobile air compressor is a machine that converts power (using diesel or gasoline motor engine) into potential energy stored in pressurized air (i.e., compressed air). This is used for cleaning the spare parts, frames, labyrinth, and for sucking and refilling oil lubricant with the use a pneumatic pump and hose.	
2	**Hydro Jetting Machine** There are many advantages of using Hydro Jetting over chemical cleaning, brush cleaning, water pipe cleaning and several other conventional methods such as. Inhibits corrosion and extends tube life by removing corrosive deposits from inside of the tubes and tube pits.	
3	Forklift Used in shifting the spare parts of turbine and compressor from site to laydown area and vice versa.	
4	**Plant Equipment Checklist**	PLANT & EQUIPMENT CHECK

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SECTION 46: ATTACHMENT HSE FORMS

ATTACHMENT -HSE FORMS

- Attachment 1: Toolbox talk meeting/safety training.
- Attachment 2: Notice on safety violation.
- Attachment 3: Incident investigation report.
- Attachment 4: Near miss/Accident report.
- Attachment 5: Personal injury log.
- Attachment 6: property damage loss.
- Attachment 7: Housekeeping Checklist.
- Attachment 8: Monthly safety report.

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TOOL BOX TALK TOPIC		SHIFT	DAY

S/N	NAME	POSITION	SIGNATURE
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

TOOL BOX CONDUCTED BY:

SIGNATURE:

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NOTICE ON SAFETY VIOLATION

GAS	**Site Safety Violation**	GAS Arabian Services Co., Ltd

Subject:

Location of Incident: -

Major Violation/~~Minor Violation~~

VIOLATION DETAILS:

NAME: -

Position: -

ID Number:

ACTION TAKEN:

SIGNATURE: (To be signed by the Violator)

Safety Supervisor: -
Signature:

Site Manager: -
Signature:

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ATTACHMENT – 3

INCIDENT INVESTIGATION REPORT

TO BE COMPLETED WITHIN 24 HOURS OF INCIDENT
1.INCIDENT DETAILS: DATE OF INCIDENT: TIME: PROJECT NAME: INCIDENT LOCATION:
2. INCIDENT TYPE: ☐ PERSONAL INJURY ☐ ENVIRONMENTAL ☐ PROPERTY DAMAGE ☐
3.INCIDENT CATEGORY: Major/LWC ☐ Minor/RWC/MTOC ☐ Near miss ☐
4. Initial Assessment of cause:
5.immediate Remedial Action Taken:

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INCIDENT INVESTIGATION REPORT

NEAR MISS/ ACCIDENT REPORT		
1.Clasification: -Near miss/ Damage Occurrence /Any other Accident		2. Date of Report: -
A. BASIC INFORMATATION		
3. Date of occurrences:		4.Time of occurrences:
5.Exact location:		6.Equipment involved:
7.Name of witness:	a.	b.
Telephone no:		
8.Informed the ☐ Clients safety Engineer at _____Hrs.		
B. INCIDENT INFORMATION		
9.Extent of damage/loss ☐ Minor ☐ Major Remarks:		
10. Describe clearly what happened (attach sketch if necessary)		
C. ANALYSIS		
11. what acts, omissions or conditions directly caused the near miss/dangerous occurrence?		
D. ACTION PLAN		
12. Recommended steps to prevent recurrence:		

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13. Investigated by:

Name:
Date:
Signature:

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NEAR MISS/ ACCIDENT REPORT

To be completed within 3 days of incident

PERSONAL INJURY LOG	
Date & Time	:
Area/Location	:
Name of Employee Injured	:
Badge No	:
Injured part of Body	:
Type of Injury	:
Brief outline of how the injury was occurred	:
Immediate Action Taken: -	
☐ First Aid given and the employee went back for work.	
☐ First Aid given and the employee sent to hospital for further treatment	
Whether reported as an accident	:
Date of return of the injured back for duty	:
If accident, whether Lost Time/Non lost Time	:
Signature of safety supervisor: - Signature of safety manager: -	

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S/N	Item	P	F	G	E
1	Grounds a) In good order, free of refuse and unnecessary materials				
2	Buildings/Shelters a) Walls and windows are reasonably clean and free of unnecessary hangings. b) Lighting systems maintained in clean and efficient manner c) Stairs are clean, free of materials, well lighted, provided with adequate handrails in good condition d) Platforms are clean, free of unnecessary materials				
3	Floors a) Safe and suitable work b) Clean, dry, free of refuse, unnecessary materials, oil or grease c) Adequate number of receptacles provided for refuse				
4	Washrooms a) Washrooms in the work spot provided b) Clean & dry c) Properly ventilated d) Water supply				
5	Tools a) Properly stored b) Free of oil & grease when stored c) In safe working condition				
6	Stock materials a) Properly piled and arranged b) Loaded safely and orderly in pans, cars and trucks				
7	Machinery and Equipment's a) Clean and free of unnecessary materials b) free of unnecessary dripping of oil or grease c) proper guards provided and in good condition				

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HOUSE KEEPING CHECKLIST

Grading: - P – Poor F – Fair G – Good E – Excellent

Inspected by: - Name: - Position: - Signature:

MONTHLY SAFETY REPORT					
For (Month-Yr.)					
Project					
Project code.		Start Date:		Date of Last LWC	
Man-hours	This Month	Cumulative Total For the Year	Since Last LWC		

	Code	This Month	Cumulative Total for the Yr....
Lost Workday Cases	LWC		
Lost Work -Days	LWD		
Restricted Worked Cases	RWC		
Medical Treat. Only Cases	MTOC		
First aid Cases	FAC		
Dangerous Occurrences			
Near miss Incidents			
Infringement Notifications			
Tool Box Meeting/Safety Training			
Safety Audits/inspections			

DETAILS OF ACCIDENT, NEAR MISS OR DANGEROUS OCCURRENCE

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Date& Location	Name, Emp. No., Title.	Brief Description	Action Recommended

MONTHLY SAFETY REPORT

DETAILS OF TOOL BOX MEETING/SAFETY TRAINING		
Date	**Topic**	**No. of Participants**
Attendance Sheets Enclosed	Class Room Training: Safety Talk: On job Training: External Training: Total:	

Attendance Sheets Enclosed	Class Room Training: Safety Talk: On job Training: External Training: Total	

DETAILS OF SAFETY VIOLATIONS			
Date/Location	Name, Emo. #, Title	Brief Description of Violation	Action Taken

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DETAILS OF SAFETY AUDITS			
Date	Area/Facility	Recommendation	Action Taken
Safety Supervisor			Technical Manager

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SECTION 47: SAMPLE EVIDENCE OF SHORT TRAININGS & TBT FILES

SAFETY AWARENESS TRAINI	training PICTURES 1.docx	Short training Records.pdf

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SECTION 48: HOUSEKEEPING

Housekeeping is not just cleanliness; it includes keeping ***work areas neat and orderly, maintaining halls and floors free of slip and trip hazards and removing of waste materials (ex. Paper, cardboard) and other fire hazards from work areas.***

Here are housekeeping rules that will help your work area safe.

1. ***Immediately clean up anything on the floor that creates a slip hazard: water, grease, paper, dust or other debris.***
2. ***Keep walkways clear of boxes and other obstruction.***
3. Close cabinets used for storage when not in use.
4. ***Never block fire exits or fire equipment.***
5. Make sure stacked materials do not impede vision.
6. ***Don't store items in or on electrical panels or control boxes.***
7. Pick up and store tools in their proper location immediately after use.
8. **Keep ventilation systems clear of dust and debris and stored materials.**
9. Make sure receptacles for waste and debris are conveniently located.
10. **Remove combustible waste often to minimize the fire hazard.**
11. Set a good example for other employees by maintaining good housekeeping in your work area.
12. Store tools on shelves, tool boards, or in toll boxes when not in use.
13. Hang up and store electric extension cords, work lights and air hoses when not in use.
14. ***Maintain floor surfaces free of oil, grease, and water or other contaminates that could contribute to a slip hazard.***
15. ***Properly dispose of old batteries, tires and parts into a dumpster or container and have removed routinely from the premises.***

Housekeeping order is "maintained" not "achieved." Cleaning and organization must be done regularly, not just at the end of the shift. Integrating housekeeping into jobs can help ensure this is done. A good housekeeping program identifies and assigns responsibilities for the following:

1. clean up during the shift
2. day-to-day cleanup
3. waste disposal
4. removal of unused materials
5. inspection to ensure cleanup is complete

Do not forget out-of-the-way places such as shelves, basements, sheds, and boiler rooms that would otherwise be overlooked. The orderly arrangement of operations, tools, equipment and supplies is an important part of a good housekeeping program.

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The final addition to any housekeeping program is inspection. It is the only way to check for deficiencies in the program so that changes can be made. The documents on workplace inspection checklists provide a general guide and examples of checklists for inspecting offices and manufacturing facilities.

Dust and Dirt Removal

In some jobs, enclosures and ***exhaust ventilation systems may fail to collect dust, dirt*** and chips adequately. ***Vacuum cleaners are suitable for removing light dust and dirt***. Industrial models have special fittings for cleaning walls, ceilings, ledges, machinery, and other hard-to-reach places where dust and dirt may accumulate.

Special-purpose vacuums are useful for removing hazardous substances. For example, vacuum cleaners fitted with HEPA (high efficiency particulate air) filters may be used to capture fine particles of asbestos or fiberglass. Dampening (wetting) floors or using sweeping compounds before sweeping ***reduces the amount of airborne dust.*** The dust and grime that collect in places like shelves, piping, conduits, light fixtures, reflectors, windows, cupboards and lockers may require manual cleaning.

Employee Facilities

Employee facilities need to be ***adequate, clean and well maintained***. Lockers are necessary for storing employees' personal belongings. ***Washroom facilities require cleaning once or more each shift.*** They also need to have a good supply of soap, towels plus disinfectants, if needed.

If workers are ***using hazardous materials***, employee facilities should provide special precautions such as ***showers, washing facilities and change rooms***. Some facilities may require two locker rooms with showers between. Using such double locker rooms allows workers to shower off workplace contaminants and prevents them from contaminating their "street clothes" by keeping their work clothes separated from the clothing that they wear home.

Smoking, eating or drinking in the work area should be prohibited where toxic materials are handled. The eating area should be separate from the work area and should be cleaned properly each shift.

Surfaces

Floors: Poor floor conditions are a leading cause of accidents so cleaning up spilled oil and other liquids at once is important. Allowing chips, shavings and dust to accumulate can also cause accidents. Trapping chips, shavings and dust before they reach the floor or cleaning them up regularly can prevent their accumulation. Areas that cannot be cleaned continuously, such as entrance ways, should have anti-slip flooring. Keeping floors in good order also means replacing any worn, ripped, or damaged flooring that poses a tripping hazard.

Maintain Light Fixtures

Dirty light fixtures reduce essential light levels. ***Clean light fixtures can improve lighting efficiency significantly.***

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Aisles and Stairways

Aisles should be wide enough to accommodate ***people and vehicles comfortably and safely***. Aisle space allows for the movement of people, products and materials. Warning signs and mirrors can improve sight-lines in blind corners. ***Arranging aisles properly encourages people to use them so that they do not take shortcuts through hazardous areas.*** Keeping aisles and stairways ***clear is important***. They should ***not be used for temporary "overflow" or "bottleneck" storage***. Stairways and aisles also require ***adequate lighting.***

Spill Control

The best way to control spills is to stop them before they happen. Regularly cleaning and maintaining machines and equipment is one way. ***Another is to use drip pans and guards where possible spills might occur***. When spills do occur, it is important to ***clean them up immediately***. ***Absorbent materials are useful for wiping up greasy, oily or other liquid spills. Used absorbents must be disposed of properly and safely.***

Tools and Equipment

Tool housekeeping is very important, whether in the tool room, on the rack, in the yard, or on the bench. ***Tools require suitable fixtures with marked locations to provide orderly arrangement, both in the tool room and near the work bench.*** Returning them promptly after use reduces the chance of being misplaced or lost. Workers should regularly inspect, clean and repair all tools and take any damaged or worn tools out of service.

Waste Disposal

The regular collection, ***grading and sorting of scrap contribute to good housekeeping practices***. It also makes it possible to separate materials that can be recycled from those going to waste disposal facilities. Allowing material to build up on the floor wastes time and energy since additional time is required for cleaning it up. Placing scrap containers near where the waste is produced encourages orderly waste disposal and makes collection easier.

Storage

Good organization of stored materials is essential for overcoming material storage problems whether on a temporary or permanent basis. There will also be fewer strain injuries if the ***amount of handling is reduced***, especially if less manual materials handling is required. ***The location of the stockpiles should not interfere with work but they should still be readily available when required. Stored materials should allow at least one meter (or about three feet) of clear space under sprinkler heads.***

Stacking cartons and drums on a firm foundation and cross tying them, where necessary, reduces the chance of their movement. ***Stored materials should not obstruct aisles, stairs, exits, fire equipment, emergency eyewash fountains, emergency showers, or first aid stations***. All storage areas should be clearly ***marked.***

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Flammable, combustible, toxic and other hazardous materials should be stored in ***approved containers in designated areas*** that are appropriate for the different hazards that they pose. Storage of materials should meet all requirements specified in the fire codes and the regulations of environmental and occupational health and safety agencies in your jurisdiction

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Safety Statistics (Last 3 years)

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HSE STATISTICS AND KEY PERFORMANCE

SL/No.		2018	2019	2020
	NATURE OF WORK: -	PROJECT	PROJECT	ROTATING LUMPSUM
1	Total Man Hours Worked	1,317,506	1,513,185	273,208
2	Fatalities/ Death	0	0	0
3	Number of Days Away from Work	0	0	0
4	Restricted to Transfer to Another Job	0	0	0
5	Medical Treatment beyond First Aid of Consciousness	0	0	0
6	Near Miss	0	0	0
7	Accident	0	0	0
8	Dangerous Occurrence	0	0	0
9	Occupational illness	0	0	0
10	Environmental Incident	0	0	0
11	Medical Treatment Cases	0	0	0
12	Motor vehicle Incidents	0	0	0
13	Recordable Loss Time Injury over 3 days	0	0	0
14	Recordable Loss Time Injury below 3 days	0	0	0
15	Number of Job Transfer or Restrictions	0	0	0
16	Frequency Rate= No of Accident Case X 1,000,000/Total Man Hours Worked	0	0	0
17	Lost Time Injury= No. of Injury X 100,000 / No. of Hours Worked	3	1	0
18	Severity Rate= No. of Days Lost X 1,000,000/ Hours Work	0	0	0

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CHECKLIST

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Signed 2.3 Check List -RFP Package

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CHECK LIST – RFP Package

CONTRACTORS are required to review the below list and the requirement listed.

Please ensure to submit the requested documents along with the Technical Bid Packages, to avoid dis-qualification

SN	Document Details	Required (Y/N)	Submitted (Y/N)	Remarks (if any)
1	Scope of Work Compliance	YES		
2	Schedule	YES		
3	Manpower Loading Chart	YES		
4	Equipment Loading Chart	YES		
5	Method Statement	YES		
6	Relevant Work Experience (with client contacts)	YES		
7	QA / QC Plan	YES		
8	Organization Chart	YES		
9	Safety Statistics (last 03 years)	YES		
10	Sub-Contracting Plan (if any)			NA

Contractor : **GAS ARABIAN SERVICES**

Signature & Date : S. Mukherjee 31/10/2021

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UN-PRICED AND TECHNICAL TERMS AND CONDITION

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UN-PRICED

Exhibit II Schedule of Compensation Extruder Site Work Contractor

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EXHIBIT II
PRICING SCHEDULE

Price Schedule Tables

Table-1; Price Schedule Summary

SPCO South-TA 2022, Extruder Works- Site Contractor

Unit no.	Price Table-Ref	Scope Summary	Cost (SAR)
Unit 42	Table-2	*Extruders Works- Site Contractor, Package-Unit 42*	*Quoted*
Unit 43	Table-2	*Extruders Works- Site Contractor, Package-Unit 43*	*Quoted*
Unit 44	Table-2	*Extruders Works- Site Contractor, Package-Unit 44*	*Quoted*

Total Price (SAR)	*Quoted*

Table-2; Price Schedule - Break Up Costs
SPCO South-TA 2022, Extruder Works- Site Work contractor Package

Equipment Ref	SCOW Ref #	SCOW Brief Description	Cost (SAR)	Ref Detail Scope
1- Unit 42/ZSK 380 /HDPE	1.1	***Overhaul Screws, Barrels & Process Section assemblies;*** *Overhauling of Screw & Barrels that includes all dismantling & Re-assembling of process parts, existing barrels & screws, screen changer, Die Head housing, pelletizer system (assembly & Gear Box), DAV valves, Hydraulic system & other accessories. Replacement of the damaged parts.*	Quoted	*For Detailed Worklist Items, Pls refer " Detail Scope" Section for 1.1 Exhibit-1*

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	1.2	***Overhaul Suprex gearbox:*** *Replacement of wearable parts at a minimum; Replace Oil. Change all bearings and sealing, check all installed parts as gears and shaft. This job also involves Uncoupling & Recoupling of Motor with Gear Box, solo run testing & alignment of Main Drive Motor. (Motor Dismantling, Overhauling, Installation, Rigging or electrical testing is not part of this scope).*	Quoted	*For Detailed Worklist Items, Pls refer " Detail Scope" Section for 1.2 Exhibit-1*
	1.3	***Overhaul Pellet Dewatering Dryers 42X84/85;*** *Replacement of Bearings, sprockets & Dry Screens*	Quoted	*For Detailed Worklist Items, Pls refer " Detail Scope" Section for 1.3 Exhibit-1*
	Sub-Total-(SAR)		Quoted	
2- Unit 43/ZSK 380 /LDPE	2.1	***Overhaul Screws, Barrels & Process Section assemblies;*** *Overhauling of Screw & Barrels that includes all dismantling & Re-assembling of process parts, existing barrels & screws, screen changer, Repair of Any Polymer leaks , Die Head housing, pelletizer system (assembly & Gear Box), DAV valves, Hydraulic system & other accessories. Replacement of the damaged parts.*	Quoted	*For Detailed Worklist Items, Pls refer " Detail Scope" Section for 2.1 Exhibit-1*
	2.2	***Overhaul Suprex gearbox:*** *Replacement of wearable parts at a minimum; Replace Oil. Change all bearings and sealing, check all installed parts as gears and shaft, Repair of Gear Box Bolts. This job also involves Uncoupling & Recoupling of Motor with Gear Box, solo run testing & alignment of Main Drive Motor. (Motor Dismantling, Overhauling, Installation, Rigging or electrical testing is not part of this scope).*	Quoted	*For Detailed Worklist Items, Pls refer " Detail Scope" Section for 2.2 Exhibit-1*
	2.3	***Overhaul Pellet Dewatering Dryers 42X84/85;*** *Replacement of Bearings, sprockets & Dry Screens*	Quoted	*For Detailed Worklist Items, Pls refer " Detail Scope" Section for 2.3 Exhibit-1*
	Sub-Total-(SAR)		Quoted	
3- Unit 44/ZSK 350 /PP	3.1	***Overhaul Screws, Barrels & Process Section assemblies;*** *Overhauling of Screw & Barrels that includes all dismantling & Re-assembling of process parts, existing barrels & screws, screen changer, Repair of Any Polymer leaks , Die Head housing, pelletizer system (assembly & Gear Box), DAV valves, Hydraulic system & other accessories. Replacement of the damaged parts.*	Quoted	*For Detailed Worklist Items, Pls refer " Detail Scope" Section for 3.1 Exhibit-1*
	3.2	***Overhaul Flender gearbox;*** *Replacement of wearable parts at a minimum; Replace Oil. Change all bearings and sealing, check all installed parts as gears and shaft. This job also involves Uncoupling & Recoupling of Motor with Gear Box, solo run testing & alignment of Main Drive Motor. (Motor Dismantling, Overhauling, Installation, Rigging or electrical testing is not part of this scope).*	Quoted	*For Detailed Worklist Items, Pls refer " Detail Scope" Section for 3.2 Exhibit-1*

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	3.3	***Overhaul Pellet Dewatering Dryers 42X84/85;*** *Replacement of Bearings, sprockets & Dry Screens*	Quoted	*For Detailed Worklist Items, Pls refer " Detail Scope" Section for 3.3 Exhibit-1*
	Sub-Total-(SAR)		Quoted	

Total Price - (SAR)	Quoted

END
EXHIBIT II

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UN-PRICED

Unit Rates

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UNIT RATES

I. MANPOWER

Following Unit Rates shall be applicable for any additional work:

SR. NO.	CATEGORY	Normal Hourly Rate 12 hrs/day (SR)	OT Hourly Rate (SAR)
1.	PROJECT MANAGER	--	--
2.	PROJECT ENGINEER ROTATING	--	--
3.	PLANNING ENGINEER	--	--
4.	ROTATING SUPERVISOR	--	--
5.	HSE INSPECTOR	--	--
6.	SR. MILLWRIGHT	--	--
7.	MILLWRIGHT	--	--
8.	PIPE FITTER	--	--
9.	RIGGER	--	--
10.	HELPER	--	--
11.	PERMIT RECEIVER	--	--
12.	STORE KEEPER	--	--
13.	OFFICE BOY	--	--
14.	MATERIAL COORDINATOR	--	--

II. EQUIPMENT

SR. NO.	CATEGORY	Rates Per day (12 hours) (SAR)
1.	TRAILER	---
2.	COMPRESSOR 375 CFM	---
3.	CRANE 50 T	---
4.	TRAILER	---
5.	FORKLIFT - 5 TON	---
6.	DIESEL GENERATOR	---
7.	PROTA CABIN	---
8.	TORQUING CREW (PER SHIFT)	---
9.	TOOL CONTAINER	---

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31/10/2021

Minimum Unit Rates shall be charged on per day basis (per day consists of 12-hours).

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المكتب الرئيسي : ص.ب ٣٤٢٢ ـ الدمام ٣١٤٧١ المملكة العربية السعودية
تليفون: ٩٦٦١٣٨٣٥١٥٠٠+ | فاكس : ٩٦٦١٣٨٣١١٥٠٠+
واصل: وحدة رقم: ٨٥٠٠، الدمام ٣٢٢٤١-٥١٥٠
الفروع : مكتب الجبيل : تليفون : ٩٦٦١٣٣٤٠٧٩١٩+ | فاكس : ٩٦٦١٣٣٤٠١٩٢٠+
مكتب ينبع : تليفون : ٩٦٦١٤٣٩٣٥١٨١+ | فاكس : ٩٦٦١٤٣٩٣٥١٧٥+

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Terms and Condition

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TECHNICAL TERMS & CONDITIONS

PROJECT TITLE : INSPECTION AND OVERHAUL ON EXTRUDER MACHINES (SPCO TA 2022) - CHEVRON PLANT
REFERENCE: RFP- REQ 25000942

GAS hereby submitting this proposal with the following considerations/inclusion and exclusion:

1 GAS-WORKS METHADOLOGY:

A. Upon received of PO, ***GAS*** will attend for kick of meeting.
B. Submission of detailed method statement and required documents for the entire activity.
C. Submission of detailed execution schedule in Primavera, considered as micro schedule.
D. Submission of documents for processing plant & equipment gate ID's.
E. Approval of submissions from CHEVRON.
F. Attending safety orientations for obtaining gate passes..
G. Review of site area / location with CHEVRON for mobilization of site facilities.
H. Mobilization of equipment at site.
I. Mobilization of manpower at site

2 SAFETY COMPLIANCE:

A. GAS shall abide by all safety regulations of CHEVRON and to make its supervisors and other personnel to be familiar with the same.

3 INCLUSION:

A. GAS will provide the qualified manpower, tools, consumables & equipment for the complete project execution. However, all special tools will be provided by CHEVRON.
B. GAS shall perform the work in accordance with CHEVRON standards.
C. Gas has considered 24 hours working during maintenance (day / night shift),
D. Double Shift working has been considered during execution, in case if there is any lagging then plan B will be generated & GAS will cover up the backlog.
E. A DPR (daily progress report) on daily basis for identifying the progress plan vs actual.
F. Gas has considered crane of 50 tons (01 No.), 40 ft containers (03 Nos.), Ablution Unit (01 No.), Tool Container (02 Nos.), Diesel Generators (01 Nos.), Air Compressors 375 cfm (01 No.), Dyna (01 No.), Trailer (01 No.), Forklift 5 Ton (01 No.), Torquing Unit (01 Nos.).

4 EXCLUSION:

A. Electricity / water / air will be provided by CHEVRON for site works, for office / store cabin GAS will arrange generator.
B. First Aid, Male Nurse, Ambulance facility will be provided by CHEVRON.
C. All instruments, cables, lubricants & spare parts etc., will be under CHEVRON scope.
D. All Scaffolding, hot work, insulation removal & installation and workshop area (if required) will be in CHEVRON scope.

5 ASSUMPTION / SPECIAL CONSIDERATIONS:

A. GAS confirmed & acceptance CHEVRON standard terms and conditions.
B. In order to fulfil the schedule commitment of the projects, it is imperative that permit to work shall be released without any delay & be ready for erection activities. GAS will request BLANKET PERMIT (for cold work), so there will be no stopage time for getting the permit, it is purely CHEVRON decision.

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We trust that you will find our technical offer satisfactory. If additional clarification is required, please do not hesitate to contact us.

Assuring you of our prompt attention & quality services at all times. We look forward to receive your positive response.

Thanking You, we remain

S. Mukherjee

Satyaki Mukherjee
Technical Manager- Field Service Divison

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